The Journal of the American Medical Association

VOL. XX. CHICAGO, MARCH 25, 1893. No. 12.

ORIGINAL ARTICLES.

PNEUMONIC FEVER--ITS SYMPTOMATOLOGY.

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CIRCULATORY SYSTEM.

The characteristics of the pulse in pneumonic fever are so striking that they could not escape the attention of the earliest medical observers, and we find them mentioned by Hippocrates, Aretæus, Cœlins Aurelianus, and others down to the time of Razes [1] who made a special study of the subject. To be sure the deductions to be drawn from the phenomena observed previous to the time of Harvey [2] must have been largely overdrawn, yet many of the facts were clearly and tersely stated.[3]

At the beginning of the attack the pulse is usually somewhat, and occasionally greatly accelerated, although in rare instances it remains normal, or even may be diminished in frequency.[4] When the disease is once fully established, however, the almost invariable rule is for the pulse to be accelerated, ranging usually from 90 to 120 per minute. At this stage of the disease it is rare to meet with a pulse under 80, but the converse does not hold good, for a rate beyond 120 is by no means infrequent. In a certain proportion of cases the pulse will mount up to 140, 160, 180, 200, or even more, per minute.[5] Such cases should be viewed with the greatest apprehension,[6] although cases sometimes recover after very great frequency of the pulse.

A female, aged 24, with pneumonic fever, locally involving the bases of both lungs, was first seen on June 10, 1855. Her respirations were 78 per minute, breath fœtid, lips cold and livid and the pulse was intermittent and so rapid that it could not be counted. On the following day the pulse was stronger and less intermittent; the respirations had declined to 58 and she began to expectorate muco-purulent masses. On the 13th, the pulse was 128 and the respirations 42 per minute. On the next day the pulse and respiration had further declined to 104 and 38, respectively, after which there was a gradual decline of all the symptoms until convalescence was established on the 20th inst.[6]

A widow, aged 35, of German birth, was taken, Jan. 21, 1877, with chilly sensations, alternating with flashes of heat and profuse perspiration, followed by the ordinary symptoms and signs of pneumonic fever, locally affecting the lower lobe of the right lung. When first seen, on the third day, the pulse was 152 per minute. On the fourth day it was 112, fifth day 108, sixth day 132, seventh day 120, eighth day 100; ninth day 130 and tenth day 86, after which it did not again rise above the normal. Veratrum viride was used throughout the course, but an irritable stomach prevented the use of any but very small doses.

A young man, aged 20, of dissipated habits, was taken June 9, 1880, at 1 A.M., with a severe chill, followed by a very severe attack of pneumonic fever, locally affecting the entire right lung. During the first few days the pulse was said to have ascended as high as 200 per minute. When I first saw the patient, in consultation, on the seventh day the pulse was 140. On the following day it was 80 and only once afterwards did it pass beyond 100.

In only three other of my successful cases did the pulse exceed 140; in all the other cases a pulse of more than 140 was met only as a precursor of death. I refer, of course, to adult patients. A high pulse rate was very frequently met with in infantile cases in which recovery ensued.

Of 154 successful cases analyzed by Bleuter,[7] 54 had pulses ranging from 120 to 150 per minute. Borland,[8] in his analysis of 190 cases found a pulse rate of over 150 only as a precursor of death. Eddes,[9] in 52 cases, found a pulse of 150 twice and 160 and 180 once each all fatal, and of 160 once with recovery. Griessinger,[10] from an analysis of 72 cases, concludes that in cases with a pulse of more than 120, one-third will prove fatal. Smith,[11] records a recovery after a pulse of 215.[12] Sauter,[13] met with two cases, females, 22 and 18 years of age, with pulses of 152 and 168, respectively, with recovery. Kreider [14] records the case of a child, aged 10, with a pulse of over 160, with recovery, and Scheef the case of a child of 4 years with a pulse of 172 with recovery. Homburger [15] mentions the case of an adult who survived a pulse of 160 for three days but finally died. Of 83 cases analyzed by Schliesinger,[16] the pulse reached 150 to 160 in three instances—all fatal.

Usually the pulse is greatly accelerated in weakly persons, and those who are the subjects of organic or functional heart disease. This is also true of women during menstruation [18] and pregnancy.[19] In children the pulse is apt to be very frequent, ranging, usually from 120 to 140 per minute, and exceptionally ascending to 180 or 200, or it may be uncountable.[20] The younger the child the more rapid the pulse.[21]

The pulse is more rapid in the evening than in the morning, sympathizing with the rise and fall of the other general symptoms. Some cases, perhaps of evident gravity, are remarkable for little or no increase, or perhaps actual diminution of the pulse rate, and this often in the face of a high fever. The result, according to my experience, is often unfortunate. Several such cases have fallen under my observation and have been noticed by others.[22]

In the aged the pulse rate is apt to be less than in the prime of life.[23] It is sometimes very rapid at the beginning, but becomes slower as the attack proceeds. It is often irregular and intermittent. Owing to the great variability in the rate, rhythm, power and volume of the pulse in the aged, the conclusions drawn from its characteristics are of less value than in earlier years. For very obvious reasons it should be observed at the heart.[24]

There is usually a very definite relation existing between the pulse, respiration and temperature—the elevation of the one above the normal being accompanied by increase in the other two.

This was long ago recognized. "The frequency of the actual pulsations is always in a direct ratio with the frequency of the respiratory movements; however, in the last periods of life it is often observed that the pulse loses its frequency and seems to have returned to its natural state, though the respirations become more and more accelerated. This is invariably a fatal sign."[25]

A steadily rising pulse with falling temperature is also very ominous.[26]

What is the cause of the increased frequency of the cardiac contractions in this disease? It has been supposed that the fact might be explained on

mechanical grounds; that, inasmuch as a considerable amount of lung tissue is rendered useless for sanguineous aëration, and as the gross amount of blood is not diminished, therefore if this is all to be exposed to the action of the air in the remaining effective portion of the lung it must necessarily be forced through the vessels at a greater speed than ordinarily, and in order to attain this increased velocity, more frequent contractions of the heart are necessary. This theory is specious, but, I appre hend, unsubstantial, as must be clear to any one upon the slightest reflection. Thus the same rapidity of pulsation appertains to other febrile diseases in which there is no basis whatever for such a mechanical explanation. Also, in this disease the pulse is often but slightly and occasionally not at all accelerated, although there may be extensive pulmonary consolidation, or *vice versa*, and it has not as yet been proven that there is any relation between the amount of hepatization and the frequency of the pulse. Again, in this malady the pulse rate falls, often suddenly, to or even below the normal at the conclusion of the exudative process, but long before the inflammatory products have been absorbed, and at a time when all the grounds for the mechanical theory are yet present in their entirety. That the mechanical irritation of theendocardium by an irritant circulating in the blood is not the sole cause is proven by the fact that in some of the most severe cases the pulse remains comparatively slow. The most probable cases of the acceleration of the pulse is that of a poison producing an impression upon the inhibitory circulatory centres of the brain, these centres possessing greater or less resisting power in different persons, or in the same person at various times, due to inherent qualities or accidental circumstances.

One of the first harbingers of approaching convalescence is a diminution in the rapidity of the pulse.[27] As in the case of the temperature the fall of the pulse is often very abrupt, so marked in some cases that a pulse of the greatest frequency may fall in a few hours to the normal. During convalescence the pulse may be slower than natural[28]—being sometimes greatly retarded as I have witnessed in several of my cases. If the pulse should continue frequent during convalescence, suspicion should be aroused that all is not as it should be or appears.

In some cases especially, those which pursue a lingering course, the heart becomes weak and irregular in its action. An accelerated, weak, irregular and intermittent pulse often indicates inflammatory disease of the heart,[29] whilst a slow and irregular one may arise from cerebral complications.[30] Of whatever nature, an irregular pulse should always excite grave apprehensions.[31] During convalescence the pulse may be for a time intermittent, but this, in the absence of other indications of danger, need cause no apprehension.

The pulse is usually full and strong in the case of previously healthy and robust patients, but the contrary may prevail if the subject be debilitated, or if the disease be of a low, adynamic character, in which case it may be full, but weak and easily compressable. This has been my experience, although many writers describe it as habitually soft.[32]

Thus Dietl[33] says that usually the pulse is small and empty, the artery feeling under the finger as if its full capacity was not being employed. This continues without any marked variation until the end of the exudative stage, after which it suddenly falls to the small and weak pulse of convalescence. Only in severe cases with extensive hepatization, in weak or anæmic individuals, or the malady is combined with typhus, or after a profuse perspiration does one observe a full and large pulse which completely expands the artery.[34]

The force of the cardiac contractions depends very much upon the volume and characters of the circulating fluid. Contrary to what one might naturally expect to be the case, they are more forcible in anæmic and weekly patients than in the plethoric and strong. In such cases, also, the action of the heart is apt to be tumultuous, stormy and irregular. This need occasion but little anxiety, although such patients are often greatly frightened at the turbulence raging within.

The pulse may be diminished in power and volume in the arm of the affected side, due to compression of the arterial trunks within the chest, as appears to have occurred in a case reported by Dumeril.[35] The force and size of the radial pulse may also be diminished or increased on either side because of a difference in the size and elasticity of the artery at the wrist, this varying widely in different individuals.[36]

Sphygmographic tracings show the pulse as being usually somewhat dicrotic, although less so than in typhoid fever. Compared with this it bears a higher pressure, the points of the curve are sharper and the up-stroke more nearly vertical.[37] In my experience very marked dicrotism has been of unfavorable import, although Juergensen [38] considers it of no particular pathological significance.[39]

Various cardiac [40] and arterial murmurs [41] may appear, be intensified or be lost during an attack of pneumonic fever.

In December, 1874, I attended a man, aged 65, suffering with pneumonic fever, locally affecting the entire left lung. He had been ill four days when first seen and his cough was paroxysmal and distressingly severe—each effort ending in profound exhaustion. On examination, immediately after a paroxysm of coughing, in addition to the ordinary physical signs of pneumonic consolidation, there was heard, plainest at the junction of the middle and outer thirds of the clavicle and less distinctly over the entire part of the chest, a loud and prominent soufflle. It seemed to be synchronous with, or to follow immediately upon the closure of the aörtic valves, but was not especially distinct immediately over them. As the disease progressed the sound became less intense and after absorption of the pneumonic deposit it could not be heard.

This sound I have heard in other cases, but in none so plainly as in the one above detailed. It has sometimes been noticed in the right side, although never so distinctly as in the left. It is probably due to compression of the subclavian artery at the point where it lies between the clavicle and first rib in front and the condensed pulmonary tissue behind, and at a time when it is distended with blood by the forcible contractions of the heart brought about by the exertion of coughing. In one of my cases a permanent, rough, direct mitral murmur became musical during the height of disease, but lost this quality with the advent of convalescence. During the attack a murmur may occasionally be heard over the heart which disappears during resolution.[43] For this no satisfactory explanation has yet been advanced. When pneumonic fever attacks a person who is the subject of a cardiac murmur it may be heard much less distinctly than usual or it may be entirely suspended.

Leaming [43] has called particular attention to this point and has detailed several illustrative cases. His theory is that the chest is an acoustic chamber and that murmurs or other sounds within it will be heard with facility or otherwise according to the conditions of the chamber. "The chest," says the author, "is a musical chamber and may be

represented by a violin. When the instrument is tuned and in order, its acoustic qualities may be considered perfect. If a watch or music-box be placed within the violin, hanging from the roof, auscultation will reveal the slightest jar or noise made by the works of the watch, or bring out with distinctness the low notes of the music-box. But if, while the ear or stethoscope is still placed upon the violin, water or sand be poured into its chamber, the sounds of the watch or box will grow feeble or disappear. The low notes of the music-box disappears entirely, as also does any jarring of the wheels of the watch. These phenomena are invariable because they are the result of acoustic law."

On the contrary I have heard the normal heart-sounds transmitted to a great distance through hepatized lung tissue, which is a very good conductor of sound. Resonance may be diminished while conduction is increased.

In some cases of pneumonic fever, from some unknown cause, and with no other symptoms of cardiac thrombosis, the veins may pulsate. I have seen this in the veins of the neck and dorsum of the hand. They are often turbid, as were noticed long ago by Aretæus.[44]

In very rare cases there may be decided pulsation of the affected side of the chest. This may be due to the impulse of the heart being propagated through the hepatized lung,[45] to the pulsation of large pulmonary vessels,[46] or a combination of both. This condition must be differentiated from aneurism, pulsating carcinoma, pulsating empyema, etc. It is not certain that this peculiar condition adds to the dangers of the malady, or that it is particularly liable to be followed by absence or purulent infiltration.[47]

I have met with but a solitary case in which this singular phenomenon was present: A young farmer, aged 23, was taken March 15, 1875, with all the ordinary symptoms of pneumonic fever, locally affecting the base of the left lung. On the fourth day my attention was attracted to a vibratile pulsating tremor all over the lower part of the left side of the chest. The pulsations were synchronous with the stroke of the heart. They did not diminish in strength as the distance from the heart increased, but seemed to be of the same intensity in all parts, except that they gradually shaded off above and below; they were not expansile and they could be felt but were not visible. There was no palpitation of the heart and the patient was not anæmic. When he lay upon his left side the patient complained of a sensation of fulness, tension and weight, as if an abscess was forming in his side. This was somewhat relieved by reposing on the right side. The sensations conveyed to the observer's hand, very strongly reminded one of those felt when the hand is placed forcibly over a large incipient abscess, although the pulsations were accompanied by tremor. The pulsations ceased two days later, with the advent of convalescence, and recovery was perfect. Repeated subsequent examinations failed to disclose any pulsation in the side, cardiac disease, or any other cause to account for the phenomenon.

In pneumonic fever a portion, often large, of the lung is rendered useless for purposes of aëration of the blood. If the circulation is not quickened the sanguineous fluid is incompletely oxidized, but if it is accelerated in a degree sufficient to compensate for the loss of aërating surface and capacity, the blood becomes purified as in health. The increase of blood pressure, requisite to obtain this result ensures the dilatation of the capillaries[48] in all parts of the body and an actual increase of the total quantity of blood in the system. This accounts for the flushed face, and the full, bounding pulse of the pneumonic patient. If, on the contrary, the heart should become tired out, or, with all its efforts, be unable to drive the great volume of blood with sufficient rapidity through the active portions of the lung,[49] an opposite condition obtains; the blood, improperly aërated, remains of a dark color, and filling out the dilated and paretic capillaries and veins,[50] gives us the well known cyanotic appearance of some of these cases. Such blood is no longer capable of yielding to the nerves and muscles of the body the proper amount and quality of nutritive materials necessary for the proper performance of their functions. The heart[51] being the organ upon which most depends at this critical time, is the first to feel the effects of this state of affairs and it becomes weakened, paretic and no longer competent to properly fulfill its function.[52] With the heart in this condition, the venous side of the circulatory tree becomes surcharged with unpurified blood. A large proportion of this excess of venous blood is constantly in the lungs, slowly working its way through the pulmonary capillaries, delayed by a damming up in front and a lack of *vis a tergo*, thus further impeding the functions of an already lame organ. Under these circumstances the cerebro-spinal centres, starving for lack of proper nutrition and loaded with noxious effete matters, weaken and a sleepy, drowsy state ends the scene. If perchance the patient escapes with his life, the cyanosis continues until the exudation begins to be absorbed and the heart is strengthened.

Cyanosis is usually more marked in the robust and plethoric for the reason that their vessels are normally overdistended, and with the diminished breathing surface oxidation does not readily occur; and also because their tissues require more and richer blood for their nutrition and load the vital fluid with a greater amount of effete matters.

Von Fleische[53] has propounded a rather curious theory to account for the occurrence of cyanosis in connection with a weak heart. It has been shown that a liquid contained in a vaccuüm can only get rid of a small portion of its constituent gas by means of a concussion just before the exhausting process is begun, and this fact may be applied to the study of the relations existing between the cardiac pulsations and the respiratory changes in the lungs. Von Fleische thinks "that the blood in the pulmonary arteries containing the carbonic acid gas in solution, is jarred by the motion of the heart, and in this way assistance is given in setting free the $C.O_2$." It is quite true as Von Fleische claims, that the physics of the process by which this gas passes from the blood serum to the air in the alveoli has been obscure, because there is little difference between the pressure in these spaces and in the blood. Von Fleische's theory affords a plausible explanation. If it is true, then cyanosis from weak heart is due, in a measure at least, to the feeble impact of the heart muscle[54].

There are some changes in the composition of the blood in this disease which are of much importance and which require attention in this place. It is constantly in the condition known as hyperinosis, and contains more fibrine, or fibrinic forming material, than in the normal state.[55] The proportion of fibrine in the shed blood, which in health is two or three parts per 1000, increases to 4 four to 10.5 parts per 1000.[56]

In estimating the amount of fibrine in the blood by means of the microscope Hayem[57] makes use of slides upon which a small disc is formed by cutting a shallow trench or groove upon its surface. The drop of blood is placed upon the disc and when pressure is applied to the cover glass the excess flows into the trench. The amount and character of the fibrine can now be readily estimated by the amount and character of the coagulation present. Evaporation is prevented by surrounding the trench by a thin layer of vaseline and sealing the cover in the usual manner.[58]

Hertz[69] states that he has sometimes observed a peculiar condition of the blood, which, on standing, gave, instead of ordinary serum, a yellowish white milky fluid, consisting of an emulsion of the finest fat drops. As the cases all recovered this condition does not seem to be of great import.

Freund[60] has made some interesting experiments illustrating the effects of oil in hindering coagulation of the blood[61] after it is withdrawn from the body. "Blood from the carotid of a dog collected under oil remained fluid at ordinary temperature for twenty-four hours; as did also blood which had been poured into a glass vessel whose walls had been smeared with vaseline. In the latter case coagulation did not ensue even if the blood was stirred with an *oiled* glass rod, although it took place in a few minutes if the blood was poured into an unoiled vessel, or was stirred with a dry glass rod. If blood caught in this way was prevented from drying, and if contamination with dust was prevented, coagulation might be prevented for several days, during which the corpuscles sank to the bottom, leaving the clear plasma on the surface. Similar observations were made with oiled canulæ and tubes, in which the blood remained fluid. As a result of his experiments the author comes to the conclusion that, as on the one hand the abscence of adhesion of the blood to the walls of the blood vessel prevents coagulation, so on the other, if any adhesion is allowed after the blood is drawn from the body, this acts as the starting point of the coagulation."[62]

Various sequences may follow the hyperinotic state of the blood and its impeded circulation,[63] the most serious of which are vascular thrombosis and heart-clot.[64]

In the case of heart-clot it may be of very slow or very rapid formation. It may occupy any of the cavities of the heart and may project into any of the efferent great vessels. Such clots may, and generally do cause rapid and sudden death, after the most distressing and alarming symptoms; although a fatal termination may occur with no symptoms pointing in this direction.

Inasmuch as heart-clot must be comparatively rare in the experience of any one observer,[65] the diagnosis is enshrouded in considerable doubt, and it may be well to study the recorded symptoms at considerable length.

Obstruction to the circulation of the blood through the right side of the heart is indicated by symptoms which are very distressing, and which usually arise with alarming suddenness. The surface of the body is pallid; the temperature falls; the radial pulse is quickly lost; the veins are turgid; there is the most distressing dyspnœa, and there is profound collapse of all the physical powers.

The livid pallor which spreads like a dim shadow over the surface is very characteristic and bears no resemblance to the paleness of anæmia. It must be seen to be appreciated. An icy coldness begins in the extremities and gradually makes its way to the trunk, and coëtaneously the body-heat rapidly falls to a low point. The coldness is objective and is rarely complained of by the patient. The pulse is weak and ribbon-like and quickly disappears from the arteries of the extremities, and this, too, in the face of a forcible and bounding action of the heart. This lack of arterial tension together with cardiac over-exertion is very characteristic. Venous fullness is a marked feature, especially in the neck, and when a vein is compressed it does not become more distended on the distal, and relaxed on the proximal sides, but remains as before.

"The respirations are rapid, heaving and sighing, but although the air freely enters the unconsolidated portion of the lung,[66] yet the horrible dyspnœa is not relieved. The distress is always referred to the region of the heart.[67] The rapid collapse of the physical powers, and finally of the mental faculties are marked phenomena.[68] "The muscular prostration is marked by restless tossing and failure without convulsion. After a time the muscles themselves collapse, the abdominal muscles are drawn in deeply with each respiration, and the power of voluntary muscles to perform any resolute act subsides. The mental prostration is equally marked. There is no apparent desire to effect anything except to breathe. The mind does not wander, neither does it sleep. A patient who recovered told me she knew everything that was going on all the time, but in such a listless way that she had no real interest in the anxious plans which we were carrying out to save her life. To the end of life there is no active convulsion; the mind loses its consciousness before the respiration ceases, and death, when it comes, is usually by a kind of coma, with asthenia or syncope."[69] Death is due, not so much to the accumulation in the system of carbonic acid as the lack of oxygen.[70]

When the obstruction is in the left side of the heart the symptoms will be quite different from those above detailed. The surface of the body will have a leaden hue and will be cold. The dyspnœa will be suffocative and convulsions and coma precede the fatal termination. The action of the heart will be very violent, tumultuous and irregular.

In case the coagulum does not pass through or adhere to any of the cardiac valves the physical signs will be equivocal, but if it does so the corresponding sound will be muffled or lost.[71] In the lungs a loud, dry and harsh respiratory murmur may be heard, together with the signs of emphysema.[72] Often no symptom pointing toward coagulation within the heart are present and the condition is only discovered by post-mortem examination.

They occur with considerable frequency, and may be present in such a large proportion of cases as to constitute a peculiarity of the epidemic.[73] It is not always clear as to where the clot first begins to form, but prolongations always extend in the direction of the sanguineous current and never in the opposite direction.[74]

Richardson[75] found the clot located in the right cavities of the heart in 80 per cent. of the cases, and in the left cavities in 6 per cent. In 3 per cent. there was hysterical simulation, and in 11 per cent. there was coagulation in the large veins.

The period at which heart clot forms is variable, but is generally late in the attack and not infrequently during convalescence. It is probable that it is oftener met with in cases in which organic disease of the heart is also present.[77]

A sailor, aged 56, was taken, after a two weeks' spree, with pneumonic fever, locally affecting both lungs. Death was preceded for twenty-four hours by active delirium. At the autopsy there was found a large ante-mortem clot in the right ventricle, auricle and pulmonary vessels. Both lungs were adherent. The left lung was solid posteriorly and the tissue cut like liver-tissue, swelling as cut. There was hepatization of the right lung posteriorly.[78]

Sometimes the clot is on both sides of the heart:—

A man, aged 58, died from pneumonic fever. At the autopsy there was found "extensive fibrinous clots in both ventricles, which were attached to the internal walls of the heart, and projected into both aörta and the pulmonary arteries, preventing the proper closing of their valves, which, added to the insufficiency of the mitral and aörtic valves, was sufficient to account for death."[79]

Occasionally the clot is located in the pulmonary arteries, whilst the cardiac cavities remain free.

A young woman, aged 19, on the second day of an attack of rheumatism, had a fit of alarming dyspnœa, with catching, shallow respiration and pain in the left side. Repeated auscultation failed to detect any alteration in the heart or respiratory sounds, although the dyspnœa rendered the

examination unsatisfactory. After remaining in great distress for two days she died, free from mental symptoms. At the autopsy the pulmonary artery, as far as its third and fourth divisions, was found to be filled with decolorized coagulum, and there was a shred of lymph in the right middle cerebral artery. The lower lobe of the left lung was hepatized. The heart was uniformly covered with recent lymph.[80]

A patient, convalescent from pneumonic fever, suddenly cried out, complaining of dyspnœa and great pain in the chest, became rapidly cyanosed and died in two and one-half hours. Post-mortem examination revealed a clot in the pulmonary artery.[81]

It is possible that a fibrinous coagulum in the heart might soften and break down into such minute particles that they could enter the circulation, pass through the pulmonary seive and be absorbed and extruded, with complete recovery of the patient. Or the softening and disintegration of the mass might proceed, with lodgement of some of the fragments in the pulmonic, hepatic, cerebral or other capillary systems, with the formation of abscesses. Or, again, the clot might become firmly attached and organized, and remain *in situ*, the patient maintaining a precarious existence for a longer or shorter period, but constantly liable to sudden death. These are certainly possibilities, but they are of the remotest character. It is true that cases are on record in which recovery has followed the condition,[82] yet in my experience the diagnosis of forming heart clot has always been followed by speedy death.

It is not always a lack of power in the heart to forcibly propel the blood that is the cause of formation of the clot. Musser[83] reports a case in which the right heart was distended by an immense antemortem coagulum, although the heart was greatly hypertrophied.

Dalmus,[84] from the study of a very interesting case concludes that the compression exerted by the hepatized lung and, possibly, pleuritic and pericardial effusion, upon the heart may so impede the flow of blood as to cause its clotting in the heart.

The increased tendency toward coagulation of the blood may lead to the formation of vascular thrombosis and their consequences—œdema, gangrene, embolism,[85] etc.

Cases of phlegmasia dolens have been reported by a number of writers[86] and I have myself met with one example.

A colored woman, aged 32, had been ailing, indefinitely, for several months, when she was suddenly seized with a severe rigor, followed by fever, cough, thoracic pain, and all the ordinary symptoms of pneumonic fever, locally affecting the entire left lung. The disease pursued a severe course, with endocarditis as a complication, but convalescence seemed ready to be declared, when, on the ninth day, a thrombus developed in the right iliac and femoral veins, with consequent great swelling of the corresponding limb. Pain in the limb was very severe for a week and the swelling began to subside at the end of a fortnight and disappeared within a month. The action of the heart continued good and the lung cleared up nicely, yet her appetite and strength failed, she lost all hope and desire of living, became greatly emaciated and prostrated, fell into a drowsy state and died, comatose, three months after the onset of the attack.

Detachment of portions of the clot, either in the heart or the veins may cause embolism of the cerebral arteries.[87]

A female with pneumonic consolidation of the right lung suffered from hemiplegia on the fourth day. The paralysis was limited to motion, with some impairment of the mental faculties. Five months later the only remains of the affection was a slight drawing of the mouth. A systolic murmur of doubtful site was developed in the course of the fever.[88]

"An elderly lady had suffered for some time from chronic bronchitis, accompanied with great debility. Suddenly pain seized her in the left side, and coincidently the temperature rose about two degrees and a half. On examination pneumonia of a limited portion of the left lung was noticed. Three days after a mitral systolic murmur became clearly audible. Shortly after this she was taken with dizziness, fixed eyes, and all the symptoms of an apoplectic seizure. The mouth was drawn to the right and there was paralysis of the left side of the body, with muffled and indistinct speech. At the time of the fit the apex murmur had become very loud. The patient speedily rallied from the stroke, the left leg quickly regained its motor power, the left arm remaining helpless somewhat longer. She was improving satisfactorily, when suddenly the breathing became rapid, and the systolic murmer, which had become all but inaudible, again became very loud. From this time, which was about six weeks after the convalescence commenced, she slowly sank, although she rallied occasionally for a short time. * * A few days before death she suddenly became speechless, and lost all power over the tongue; there was no loss of sensation or motion in any part of the body. The murmur at the apex continued very loud quite up to the last."[89]

Paraplegia possibly due to the same cause, has been early noticed.[90]

If the blood of a pneumonic patient is allowed to flow into a receptacle it will retain its heat longer than natural, coagulate slowly[91] and the clot will be smaller and firmer and retain its consistence longer than usual. It will be covered with a buffy coat and the serum will have a pure lemon color.[92] It preserves its specific odorous exhalation. The proportion of white corpuscles is increased.[93] In severe or fatal cases there is a tendency toward crystalization of the hæmoglobin, after it has been on the slide for several hours.[94] Urobiline[95] is present in many cases.[96] The sulphate[97] and tartrate[98] of soda is increased, with a diminution of the phosphates and chlorides. The blood may present a milky appearance from the presence of fat globules.[99] The proportion of red corpuscles[100] is diminished[102] and hydræmia may be present.[103] Purulent infection of he blood may occur in rare instances.

According to Jaccoud the evolution of such a case is as follows: "An individual in perfect health, attacked with acute pneumonia, the malady presents the characters and the cource of marked simple pneumonia, nothing present to foresee the terrible incidents of which it may be the starting point. In ordinary cases, the acute phasis reaches its term, the fever ends, but the febrile defervescence is not followed by complete local repair, the remains, more or less extensive, of the pneumonic focus persists without any alteration. After an indefinite period, during which the malady is stationary, the situation of the patient is aggravated, and he succumbs after having presented indubitable signs of a state of infection. At the autopsy, one notices spots of suppuration in the pneumonic remains, and diffuse purulent foci, either in the limbs, or in the viscera. The patient having been seized with pneumonia in perfect health, the pneumonic remains having been during several days the only lesion present, it is certain, taking the incidents chronologically, that the suppuration of the lung is the starting point of the purulent foci, and of the general infection of the organism. Moreover, if these foci be submitted to microbian investigation, one can seize and place in evidence the intermediate agents between the primary and the secondary lesions, for the same microörganisms which are discovered in the suppurating spots of the lung, are found in the blood and all the foci without exception."

The heart is usually somewhat increased in volume[104] generally by dilatation.[105] The augmentation of size may remain stationary or it may oscilate between wide extremes. Its muscular tissue is weakened, softened[106] and, in some cases, affected with fatty degeneration.[107] Under such circumstances rupture or paralysis[108] of the heart is a not very remote possibility.

In one case, in which the entire left lung was hepatized, with rheumatism of the left knee as a complication, rupture of the heart, with rapid death, occurred on the tenth day.[109]

Such unfortunate contingencies are more apt to prevail in persons who are the subjects of present or former inflammatory affections of the heart.

A sailor, aged 23, under treatment for secondary syphilis, was discharged improved, to be again admitted for "chronic bronchitis" three weeks later. He had a troublesome cough, and complained of abdominal pain, became gradually weaker, and after five days awoke at 3 P.M., with an intense pain in the region of the heart, became convulsed and died comatose in forty minutes. At the autopsy the lower lobe of the left lung was found hepatized and the heart covered with plastic exudation.[110]

Aneurism of the aorta may be developed [111] or ruptured [112] during an attack of pneumonic fever, and the inquiry seems pertinent, whether this might not be due to the strain of coughing.

Hæmorrhages from various parts of the body, *e.g.*, stomach,[113] intestines[114] kidneys,[115] uterus,[116] hæmorrhoids,[117] lungs,[118] nose, etc., may occur and sometimes from peculiarities of the epidermic influences, such hæmorrhages are the rule.[119]

Epistaxis is a very common symptom and in my experience it has been met with as frequently in pneumonic as in typhoid fever. In general it is of only moderate severity, but in some cases it may be so profuse as to endanger, or even destroy life.[120]

A man, aged 30, was taken with pneumonic fever in May, 1879. During the first and second days there were frequent slight hæmorrhages from the nose. During the night of the third day he bled from the nose to an enormous—almost incredible—extent, which left him in such a low and feeble state that he died during the following day.

Epistaxis occurs as a premonitory symptom,[121] or at any time during the attack, but most often in the earlier days.[122] I have only seldom met with it during the decline of the disease.

In viewing epistaxis as a symptom of this diseases, certain facts regarding nasal hæmorrhages should be borne in mind, otherwise false views and inferences might be drawn from this phenomenon. Thus different ages are variously predisposed to such bleedings; they being much more common in childhood and youth than in after years.

Epistaxis is considered critical [123] and of benefit by a number of writers, and I have often seen headache, restlessness, anxiety and delirium greatly benefited or entirely relieved by free nasal bleeding.[124]

In some lingering cases of pneumonic fever occurring in the aged, the weak and the debilitated, hypostatic congestion of the lungs ensues, especially if the patient lies for a long time in one position.

It is always the most dependent portion of the lungs which are affected, and the causes seem to be those above indicated, together with a weak inspiration and feeble circulation, the efforts of the heart being unable to overcome the force of gravity, thus allowing the access of passive congestion, blood stasis and œdema, whilst the weak respiration allows collapse of lobules within the affected area. Under these circumstances an exudation of liquor sanguinis, blood-corpuscles, etc., follows as a necessary consequence.

When this unfortunate condition arises the symptoms take on an alarming character, especially if the extent of the congestion is very great, as it may be.[125] Of these the most marked is increasing aud profound prostration. The pulse becomes weak and very rapid; the veins are distended and cyanosis is marked; œdema of the feet and back may be noticed; respiration is frequent and superficial, and muscular prostration is extreme.

Piory [126a] has called attention to the important fact that these patients almost invariably keep the mouth widely open when asleep. This is in consonance with my own experience, and I have seldom failed to find evidences of hypostatic congestion when this symptom has appeared. In these one finds, in the morning after sleep, the mouth tongue and lips dry and covered with sordes. The dryness also extends deep down into the throat and, until after the parts have been moistened, speech is difficult.

Pericarditis is a not infrequent complication of pneumonic fever [127] and is found post-mortem in a larger proportion of cases than their clinical histories would lead us to expect.

Of 265 cases of pneumonic fever collected by Ormerod,[128] 33, or 12.4 per cent. were complicated by pericarditis. Of the 133 cases analyzed by Fint [129] it was present in 8, or 6 per cent. It occurred in 80, or 1 per cent. of 8000 consecutive cases observed in the Vienna General Hospital.[130] Huss [131] found it in 22 of ,2710 cases. Juergensen [132] in 9 of 230 cases, Doubleday [133] in 6 of 252 cases, Caton [134] in 2 of 85 cases and Satterwaite [135] in 10 per cent. of his cases. It was known to be present in 12 of my 498 cases.[136]

During some epidemics of pneumonic fever a very large proportion of cases are complicated by pericarditis.[137] It may occur in patients of any age, but it is most frequent in children [138] and young adults. It may appear at any stage of the attack, but in quite a large proportion of cases it makes its appearance early, simultaneously or even in advance of the pulmonary affection, although it usually comes on at a later period. In some cases it seems that the pericarditis is due to an extension of inflammation, although an attentive study of the subject leads me to believe that the pulmonary, pleural and pericardial inflammation are due, in the vast majority of instances to a common cause.[139]

Rheumatism sometimes precedes pneumonic fever, and may exercise a certain influence in locating inflammation in the pericardial sac.[140] In non rheumatic cases endocarditis is rare, and the patient need have no fear of grave valvular lesions, with their sequelæ.

Pericarditis may complicate pneumonic fever affecting either lung, but more often when it is left-sided.[141] Often the inflammation is most marked on the external surface—essentially a pleurisy—and the effusion escapes into the pleural cavity.[142] Adhesions between the pericardium and pleura are of frequent occurrence.[143] There is usually but a very moderate amount of intra-pericardial inflammation and effusion, although cases of very extensive effusion are not rare [144]

A stonemason, aged 25, was taken, February 21, 1862, with a sharp throbbing pain in the left side, which was aggravated by deep breathing, moving or lying on either side. In the evening he had distinct rigors and shivering, with nausea, great thirst, anorexia and other febrile symptoms. His countenance became pale and anxious, the skin hot and perspiring, respiration frequent and diaphragmatic, pulse 140, sleepless and restless, tongue dry and brown, and he expectorated rusty sputæ. The lower portion of the left side of the chest was dull on percussion, the sounds audible only here and there, tubular, and a total absence of the vocal fremitus. The impulse of the heart was diminished and its sounds almost inaudible. The urine was acid, and contained nearly the normal amount of chlorides, although they subsequently diminished in quantity. From day to day the symptoms varied, the left intercostal space began to bulge, dullness ascended, and he was tapped to the amount of two pints of thin pus on the 8th of March, and to about the same amount on the 1st of April. He died eight days later. At the autopsy the pericardium was found enormously distended with pus—"so much so that on puncture the pus spurted up to the ceiling of the room"—the quantity being about fifty ounces. The valves and muscles of the heart were unaffected. The left pleura was thickened and the sac filled with pus.[145]

The effusion may be either serous[146] or purulent,[147]

and is quickly removed by absorption or remains, to a greater or less extent, more or less permanently. This latter contingency does not depend so much upon persistency of the inflammatory action as upon the presence of extensive, thick and non-vascular false membrane or occlusion of lymph channels, which embarrass or prevent absorption. On this ground can be explained many cases of long delayed absorption of inflammatory effusions into serous cavities; the fluid remaining quiescent or diminishing very slowly until the false membranes are more or less absorbed and become vascular.

A man, aged 20, was taken with rheumatic fever, chiefly affecting the left knee, on January 22, 1851. On the sixth day pneumonic fever appeared as a complication, various parts of both lungs being inflamed. On the sixth day the pulse suddenly dropped from 108 to 90, and became intermittent. On the ninth day the respirations were very frequent, and inspiration was accompanied by a peculiar catching movement of the diaphragm, as in hiccough. The expression was one of restraint, similar to the sardonic grin. The urine became albuminous and the respirations rose to 70 per minute. On the seventeenth day the left side of the chest became suddenly tympanitic, with succussion sounds, bubbling and metallic tinkling. The heart was not displaced. At this time also occurred profuse purulent expectoration, with drenching perspiration, rapid pulse and great dyspnœa. Death occurred on the twenty-second day, and at the autopsy the pericardium was found greatly distended with fourteen ounces of bloody serum; the heart covered with a thick and shaggy coating of lymph and adherent at the apex to the parietal layer of the pericardium.[148]

The intra- and extra-pericardial effusion are usually of the same character, although one may be serous whilst the other is purulent.[149] The deposit of lymph may be of great thickness.[150]

A young man, aged 19, fell into the water, in July, 1863, and was promptly attacked by pneumonic fever. On the left side, and subsequently on the right side also, there was heard bronchophony and a friction sound. There was great distress, embarrassed respiration and attacks of syncope. The pulse was small, feeble and irregular. The area of cardiac dullness was increased and the sounds were scarcely audible. During the last few days of life the chest became very prominent. He died on the eleventh day. At the autopsy the lower lobes of both lungs were found hepatized. The pericardium was distended with about twenty-two ounces of pus. Anteriorly and above the sac was softened. The heart was covered, to the extent of nearly an inch in thickness, with firm lymph. The valves and muscular structure were healthy. The pleuræ over the affected portions of lung were thickly coated with lymph.[151]

When both lower lobes are consolidated the pericardial bulging sometimes takes the most curious directions.[152]

Pericarditis occurring as a complication of pneumonic fever invests the case with great danger.[153] Not only is one grave diseased condition engrafted upon another, but it is an affection of the one organ of the body which, above all others, is most needed in its integrity. Even if the patient is so fortunate as to recover, he does so only after a prolonged convalescence and by escaping a most pronounced peril.

Although when pericarditis appears upon the pneumonic stage the case is at once endowed with the most dramatic interest, yet its presence, from the vagueness of its signs and symptoms, is not only often unsuspected at first, but in many cases it remains absolutely undiscovered—perhaps undiscoverable.

Among the symptoms pointing to the presence of pericarditis may be mentioned præcordial pain and distress, abnormal action of the heart, and certain plessimetric and stethoscopic signs. The pain is sometimes entirely absent, but at other times it is simply unbearable, and between these extremes there is every possible grade. The heart's action is almost always disordered. On inspection there is often seen, and it may also be felt, an undulating and wavy motion over the region of the heart;[154] or the action may be pounding, tumultuous or irregular, and either stronger[155] or weaker than natural. The pulse is small, weak and irregular, although it may occasionally be full, forcible, trembling or cantering.[156] Friction sounds are often heard. They are usually synchronous with the action of the heart, but in rare cases they may be coincident with the respiratory movements.[157] The friction sound is often rendered stronger and clearer, or is developed by pressure of the stethoscope.[158] The cardiac sounds seem distant and muffled if effusion is present.[159]

Although pneumonic fever and ulcerative endocarditis are often associated together, yet it is rather strange that ordinary endocarditis is met with as a complication of the first named disease so rarely that the subject is scarcely mentioned in the books.

Thus Huss[160] found endocarditis a complication in only four of 2,710 cases analyzed by him. Hermann[161] once in forty-four cases, Waller[162] once in eighty-one cases and Stortz[163] in two of 286 cases analyzed by him. It was detected only twice in my series of cases. Single cases, however, have been reported by a number of observers.[164]

Endocarditis as a complication is most apt to appear during the second stage[165] and is very dangerous.[166] The inflammation may be of limited extent or it may involve the whole surface of the membrane, and the action may penetrate so deeply as to cause abscess[166] and ulceration.[167]

A man, aged 40, died from pneumonic fever, and at the autopsy "the heart was found firmly contracted, and on the middle anterior surface of the right ventricle was an opaque pearl-colored plaque, the seat of a circumscribed inflammation."[168]

A man died on the sixth day of an attack of pneumonic fever, locally affecting the right side. At the autopsy the entire right lung was found consolidated. The edges of the mitral and aortic valves were thickened and each aortic cusp was perforated by a large rough-edged ulcer.[169]

A male, aged 17, had an attack of pneumonic fever, from which he was fairly convalescent, when symptoms of cardiac disorder led to an examination of the heart. The apex beat was found below and to the left of the nipple, with bulging of the præcordial space and an enlarged area of impulse. There was a to-and-fro murmur at the base, over the aörtic valves, and a systolic murmur at the apex. In addition there was detected a faint pre-systolic murmur over the area of the mitral obstructive murmur. The case progressed rapidly, dyspnœa and weakness increased, and a fatal termination ensued twelve days after the first examination. At the autopsy the heart was found to be greatly enlarged, particularly the left ventricle, which was dilated to twice its normal size. The left auricle was also greatly dilated and its walls thickened. The endocardium was thickened and opaque, as were also the aortic cusps. From all the cusps sprang large masses of vegetations, and a mass of these was developed upon the wall of the ventricle a quarter of an inch below the aortic valves. The mitral valves were contracted in a funnel-shape by thickening and adhesions of the vela. The chordæ tendinæ were thickened and shortened. The papillary muscles were lengthened, The right side of tho heart was not materially altered and the pneumonic inflammation was resolved.[170]

REFERENCES.

1 De re Med. ad Alemansor, Lib. x, c. i.

2 Exercit. Anatom. de Motu Cordis et Sanguiné, Lond., 1628.

3 It appears that the human pulse was first accurately counted by Kepler before the year 1600. See Mitchell, N. Y. Med. Jour., Sept. 26, 1891, p. 356.

4 See also Cleghorn, Dis. Minorica, 1761;—Cullen, Prac. Phys., Phila., 1792, Vol. 1, p. 178;—Drake, On Fevers, Phila., 1854:—Grisolle, Traité de la Pneumonie;—Jurgensen, Ziemssen's Handbk., Bd. v. S. 78;—O'Connel, De Morb. Acut., p. 235;—Raven, Lond. Prac., Vol. xxxi, p. 34;—Et al. In such cases investigation may reveal the fact that the patient has, normally, a slow pulse. See the cases recorded by Smith, N. Y. Med. Rec., Dec. 31, 1887, p. 814. Squire, Ibid., Nov. 26, 1887, p. 678.—Thompson, Am. Prac., Jan. 1876, p. 6, et. al.

5 Oliver, Lancet, 1890, Vol. xi, p. 761, reports a case in which the pulse attained a frequency of 240 per minute.

6 See also Andral, Med. Clin. Phila., 1842, Vol. ii, p. 196.—Bleuler, Inaug. Diss., Zürich., 1865.—Chomel, Pneumonie, Leipzig, 1841, S. 299;—Di etl, Pneumonie, Wein, 1848, S. 36.—Eddes, Boston Med. and Surg. Jour.

Dec. 13, 1877, p. 694.—Flint, Prac. Med., 1868, p. 186.—Fox, Reynold's Syst. Med., Vol. ii, p. 171.—Griessinger, Arch. d. Heilk., Bd. i, S. 471.—Grisolle, Op. cit.—Heiss, Inaug. Diss. München, 1857.—Holt, N. Y. Med. Rec., Feb. 14, 1885, p. 174.—Juergensen, Op. cit., S. 75.—Niemeyer, Spec. Path., Berlin, 1862, Bd. 1.—Oppolzer, Spec. Path., Erlangen, 1870.—Parkes, Lancet, Feb. 3, 1855, p. 123;—Pause, Inaug. Dissert., S. 127;—Schliesinger, Inaug. Diss., Berlin, 1873, S. 19;—Robb, Jour. Am. Med. Asso., Nov. 28, 1885, p. 614.—Sturges, Pneumonia.—Sauter, Inaug. Dissert., Breslau, S. 50; London, 1876, p. 61.—Routh, Ass. Med. Jour., June 8, 1855, p. 533.—Swett, Diseases of the Chest, N. Y., 1856, p. 103.—Todd, Med. Times and Gaz., Dec. 18, 1852, p. 611.—Traube, Gesam. Abhandb., Smith, Med. Times and Gaz., Apr. 26, 1883.—Walshe, Dis. Lungs, Phila., 1860, p. 289.—Wunderlich, Spec. Path., u. Therap., and Inaug. Diss., Tüb., 1868, S. 28.—Ziemssen, Pleuritis und Pneumonie, Berlin, 1862, S. 217, and others.

[6] Parkes, Op. cit. p. 123.

[7] Inaug. Diss., Zürich, 1865.

[8] Boston City Hospt. Rpts., 1870.

[9] Op. cit., p. 694.

[10] Op. cit.

[11] N. Y. Med. Rec., Dec. 31, 1887, p. 814.

[12] See also Baginsky, Pneumonie, Würzb., 1880, S. 14;—Sturges, Op. cit., p. 260;—Satterthwaite, Phila. Med. News, Jan. 5, 1889, p. 5;—Ziemssen, Op. cit.

[13] Inaug. Dissert., Breslau, 1891, S. 38 u. 39.

[14] N. Y. Med. Rec., Sept. 7, 1889, p. 261.

[15] Inaug. Dissert., Tüb., 1882, S. 35.

[16] Inaug. Dissert., Strassb., 1879, S. 34.

[17] Inaug. Dissert., Berlin, 1873, S. 19.

[18] See also Lange, Gaz. des Hôp., 1886, No. 147.

[19] See also Cazeaux, Prac. Midwifery, Phila., 1868, p. 479.

[20] For many years past I have gained great advantage in accuracy in counting very rapid pulses by noting every second beat and multiplying the result by two. See also Hoadley, Jour. Amer. Med. Ass., Feb. 14, 1885, p. 188.

[21] See also Fox, Reynolds' Syst. Med., Vol. ii, p. 171.—Ziemssen, Pleuritis und Pneumonie, S. 217, and others. Koettnitz, Inaug. Dissert., Halle, 1882, S. 27, says that in children the pulse may remain frequent—140 to 160,—for some time after the crisis.

[22] In one case, at the acme of the fever, and with great dyspnœa, burning skin, etc., the pulse was only 48 per minute. Gaz. Mèd. 1830, p. 61.—See also Cleghorn, Dis. Minorica, p. 261;—Dietl, Op. cit., S. 36;—Walshe, Dis. Lungs, p. 289; et al.

[23] See also Fox, Op. cit., p. 170;—Hourmann et Dechambre, Arch. Gén. de Méd., T. xii, 1836; et al.

[24] Favre, Le Semaine Mèd. 1887, and Thurber, Ann. Univ. Med. Sci., Vol. iii, 1888, p. 365, have noticed cases in which the radial pulse was weaker or suppressed on the side affected by the pulmonary inflammation.

[25] Andral, Op. cit., p. 156. This was noticed only once in my series of cases.

[26] See also Lépine, Pneumonie, Wein, 1883, S. 164;—Loraine, De la Temperature, Paris, 1877, p. 404.

[27] See also Juergensen, Op. cit., S. 79;—Nothnagel, Arch. f. k. Med., Bd. xvii, S. 201; et al.

[28] This occurs in pneumonic fever oftener than in any other disease. See Riegel, Centralb., f. d. Med. Wissensch., 1890, No. 34.

[29] See also Todd, Med. Times and Gaz., Dec. 18, 1852, p. 611.

[30] See also Smith, Med. Times and Gaz., Apr. 26, 1873.

[31] Andral, Med. Clin., Vol. ii, p. 137, in commenting upon one of his fatal cases called attention to the presence of a very irregular pulse which, erroneously I think, he considered of no particular importance. See also Robb, Jour. Am. Med. Ass., Nov. 28, 1885, p. 614;—Bowie, London Lancet, 1889, Vol. i, p. 422;—Satterthwaite, Phila. Med. News, Jan. 5, 1889, p. 6.

[32] See Dutcher, Cincinn. Lan. and Observ., Jan. 1861, p. 10; et al.

[33] Op. cit., S. 44.

[34] See also Kauffman u. De Bary, Berliner klin. Wochenschr., 1888, Nr. 28, S. 557;—Spangler, Inaug. Dissert., Zürich, 1887, S. 26;—Basch, Berliner klin. Wochenschr. 1887, Nr. 11. u. folg.

[35] Arch. Gen. de Méd., T. xiii, p. 78.

[36] See also Guttmann, Phys. Diag., N. Y., 1880, p. 183.

[37] For further information see Fox, Op. cit., p. 737.—Galabin, Guy's Hospt. Rpts., Vol. xix, p. 79.—Holden, The Sphygmograph, Phila., 1874.—Jaecoud, Clin. Méd., T. 1.—Juergensen, Op. cit. S. 76.—Keyt, Cincinnati Clinic, Aug. and Sept. 1877, p. 87 and p. 99.—Lépine, Pneumonie, Wein, 1883, S. 60.—Marey, Comp. Rend. Acad. Méd., 1872.—Rosenstein, Berliner klinische Wochenschr., 1877, and others.

[38] Op. cit., S. 80.

[39] Dietl, Op. cit., S. 45, believed the best pulse for a patient with pneumonic fever to be one which remains small and empty throughout the entire exudative stage.

[40] See also Carroll, Cincinnati Lan. and Observ., Aug., 1863, p. 473;—Flint, Jour. Am. Med. Ass., July 19, 1884, p. 87;—Prince, N. Y. Med. Rec., Apr. 20, 1889, p. 425.

[41] See also Fisk, N. Y. Med. Rec., Dec., 24, 1887, p. 794;—Seeley, Ibid., Nov. 5, 1887, p. 595;—Richardson, Asclepiad, Vol. vi, No. 23, 1889;—Tordieu, Jour. de. Méd., No. 18, 1889.

[42] See Fox, Reynolds' Syst. Med., Phila., 1880, Vol. ii, p. 175;—Graves Clin. Med., Dublin, 1838.

[43] Trans. N. Y. Acad. Med., 1875.

[44] Op. cit., Lib. 11, cap. i.

[45] See Laennec, Traitè de l' Auscult. Méd., Paris, 1819.

[46] See also Graves, Clin. Med., Dublin, 1838.

[47] For further information consult Chomel, Pneumonia, Leipzig, 1841, S. 121;—Fox, op. cit., p. 169;—Jour. Am. Med. Ass'n, Vol. iii, p. 207;—Walshe, Dis. Lungs, Phila., 1860, p. 38.

[48] In one of my cases there was distinctly noticable a pulsation of the capillaries under the finger nails, the white lunula becoming smaller with every systole of the heart. The phenomenon was best seen when the hand was raised. See also Quicke, Berliner k. Wochenschr., 1868, Nr. 34.

[49] The blood pressure is not very greatly influenced by the temperature. See Wiegandt, Centralb. f. d. med. Wissenschaften, Jan. 27, 1886.

[50] See Aretæus, De Caus. et Sig. Acute Morb., Lib. 11, c. i.

[51] In children the left ventricle is relatively more powerful than in adults and they are therefore less liable to heart-failure. See Baginsky, Pneumonie und Pleuritis, S. 42;—Holt, N. Y. Med. Rec., Feb. 14, 1885, p. 177.

[52] See also Bardenhewer, Berliner k. Wochenschr., 1875;—Thorowgood, London Lancet, 1887, Vol. xi, p. 1169. Homburg, Inaug. Dissert., Strausb., 1879, S. 95, and Munzinger, Deutsche Arch. f. k. Med., Bd. xix, doubt whether this is due to degeneration of the cardiac muscular fibre.

[53] N. Y. Med. Rec., June 11, 1887, p. 659.

[54] This theory, followed out to its logical conclusions, would suggest gentle percussion of the præcordia as a rational therapeutic measure.

[55] See also Andral, Essai Hæm. Path., p. 87;—Hayem, Rev. Méd. Franc. et Etrang., Nov. 1, 1884;—Osler, N. Y. Med. Rec., Apr. 10, 1886;—Zimmermann, Analyse, des Blutes, S. 370;—Et al.

[56] Of ninety cases examined by Andral (Op. cit., p. 87), in seven cases the fibrine bore the proportion of 4 to 5 per 1000 parts; in seventeen cases it was 5 to 6 per 1000; in nineteen it was 6 to 7 per 1000; in fifteen it was 7 to 8 per 1000; in seventeen it was 8 to 9 per 1000; in nine it was from 9 to 10 per 1000, and in six it was over 10 per 1000 parts. Zimmermann (Präger Vierteljahrschr., 1855) found the blood normal in eight cases of commencing pneumonic fever. After hepatization was once established the proportion of fibrine was always increased. For further information consult Andral et Gavarret, Rech. sur la Composit. du Sang, Paris, 1842;—Fox, Reynold's Syst. Med., Phila., 1880, Vol. ii, p. 197;—La Roche, Pneumonia, Phila., 1854, p. 362;—Loomis, Pepper's Syst. Med., Phila., 1885, Vol. iii, p. 313;—Simon, Chemistry of Man;—Et al.

[57] Op. cit. and London Lancet, June 19, 1880.

[58] For a consideration of the influence of the blood-plaques upon the formation of fibrine and the coagulation of the blood see Afanarsiew, Deutsche Arch. f. k. Med., Bd. xxxv;—Donne, Comp. Ren. de l'Acad. des Sci., 1842.—Eberth und Schimelbusch, Virchow's Arch., Bd. ciii.—Hayem, Arch., de Phys. 1878-79.—Kemp, Studies, 1886.—Norris, Phys. and Path. Blood, 1882.—Ranvier, Gaz. Méd. 1873.—Schultz, Arch. f. Mik. Anat., Bd. 1.—Zimmermann, Virchow's Arch., Bd. xviii.—Bizzozeri, Ibid. Bd. xc.—Osler, Proc. Ry. Soc., 1874, and N. Y. Med. Rec., Apr. 3, 1886, and others.

[59] Deutsche Med. Wochenchr., 1881, Nr. 27.

[60] Med. Jahrb., 1886, Heft 1, S. 46.

[61] Wooldridge, London Lancet, 1887, Vol. ii, p. 1319, found that the stroma of the red blood corpuscles have a remarkable influence upon the coagulation of the blood, and thinks this probably due to the presence of lecithin.

[62] See Jour. Am. Med. Ass'n, Aug. 14, 1886, p. 279.

[63] See Paget, Holmes' Syst. Surg., Phila., 1882, Vol. i, p. 403.

[64] Fenwick, Lancet, 1891, Vol. i, p. 248, met with clot three times in 502 cases.

[65] Cases are reported by Baker, Pneumonia, Lansing, 1888, p. 306;—Baron, Arch. Gén. de Méd., 1838, T. ii, p. 17;—Bouillaud, Mal. du Cœur, T. ii, p. 716;—Carswell, Illst. Forms of Dis., art. "Mortification."—Carroll, Cincinnati Lan. and Obsv., Aug., 1862, p. 475.—Doubleday, N. Y. Med. Rec., Mar. 28, 1885, p. 343.—Fox, Op. cit., p. 199.—Hasse, Path. Anat., S. 214.—Huss, Lungenentzündung, Leipzig, 1861, S. 132.—Obrien, London Lancet, 1889, Vol. ii, p. 851;—Paget, Med. Chir. Trans., Vol. xxvii.—U. S. Marine Hospt. Rpts., Various years.—Virchow, Gesam. Abhandl., S. 222.—Cruvielhier, Path. Anat. Liv. xxxii, p. 2.—Malherbe, Jour. de Méd. de Nantes, 1843, and many others.

[66] See also Fitz, Op. cit., p. 103.

[67] See Richardson, Op. cit., p. 659.

[68] See Gerhardt, Volkmann's k. Vorträge, Nr. 91, S. 726.

[69] Richardson, Op. cit., p. 659.

[70] Pleuger, Wagner's Gen. Path., p. 563.

[71] See Guiteras, N. Y. Med. Rec., June 11, 1887, p. 665.

[72] Betz, Memorabilien, Apr. 30, 1877.

[73] See Chomel, Pneumonia, S. 245;—Loomis, Op. cit., p. 313;—Maulius, London Lancet, N. Y., 1883, Vol. i, p. 4.79;—Ozanam, Mal. Epid., Paris, 1817-23, T. iv;—Sturges, Pneumonia, p. 6;—Et al.

[74] Fitz, Boston Med. and Surg. Jour., Jan. 25, 1877, p. 103, has made an observation seemingly at variance with this assertion.

[75] See Jour. Am. Med. Asso., Dec. 11, 1886, p. 659.

[77] See case in U. S. Marine Hospital Repts., 1883, p. 230.

[78] U. S. Marine Hospt. Rpts., 1883, p. 180.

[79] U. S. Marine Hospt. Rpts., 1886, p. 224.

[80] Sturges, Pneumonia, London, 1876, p. 70.

[81] Doubleday, N. Y. Med. Rec., March 28, 1885, p. 343.

[82] See Barnes, London Lancet, 1884, Vol. i, p. 164;—Broadbent, Ibid., p. 164;—Clarke, Ibid., Vol. ii, p. 263;—Playfair, Ibid., Vol. i, p. 164;—Richardson, Jour. Am. Med. Asso., Dec. 11, 1886, p. 659;—Wiltshire, London Lancet, 1884, Vol. i, p. 164.

[83] N. Y. Med. Jour., Jan. 26, 1884, p. 108.

[84] Jour. de l'Experience, T. i, p. 493.

[85] Thompson, Jour. Am. Med. Asso., July 24, 1886, p. 92.

[86] Dietz, N. Y. Med. Rec., Mar. 17, 1883, p. 290;—Dumontpallier, London Lancet, Feb. 5, 1859, p. 135;—Hosmer, Boston Med. and Surg. Jour., Nov. 20, 1879, p. 726;—Moore, London Lancet, 1884, Vol. i, p. 1026;—Et al.

[87] A number of references on this point have been misplaced.

[88] Luc, La France, Méd., April 23, 1884.

[89] Clarke, London Lancet, 1884, Vol. ii, p. 263.

[90] See Huxham, On Fevers, p. 183.

[91] If many bleedings are made the blood last drawn will coagulate more rapidly than that first shed. See Meigs, N. W. Med. Jour. 1849, p. 133.

[92] In one of the cases reported by Andral, Med. Clin., p. 140, the shed blood, after standing awhile, became covered with a thin greenish coating.

[93] See Escherich, Berliner k. Wochenschr., 1884, Nr. 10, S. 146;—Lépine, Op. cit. S. 158.—Rokitansky, Path. Anat., Phila., 1855;—Et. al.

[94] See Bond, London Lancet, 1887, Vol. ii, p. 511.—Lichtenstern, Ueber den Hæmoglobininhalt des Blutes, Leipzig.—Ziemssen, Jour. Am. Med. Asso., July 9, 1887, p. 39.—Et. al.

[95] Probably a product of bilirubin and biliverdin.

[96] See Hayem, Med. Prese, Aug. 17, 1887.

[97] Jarisch, Schmidt's Med. Jahrb., 1877, S. 60.

[98] Poulet, Arch. de Physiol., 1888.

[99] See Lépine, Op. cit., S 65.

[100] Osler, N. Y. Med. Rec., April 10, 1886, p. 407, has seen red blood corpuscles within other corpuscles.

[101] See Huss, Lungenentzündung, Leipzig, 1861.

[102] See Ziemessen, Op. cit.

[103] Jour. American Med. Assoc., Sept. 11, 1886, p. 307.

[104] Giovanni, N. Y. Med. Rec., March 29, 1884, p. 349;—Loomis, Pepper's Syst. Med.

[105] The greater the dilation the more danger there is present.

[106] Louis, On Phthisis;—Van Santvoord, N. Y. Med. Jour., Oct. 10, 1885, p. 413.

[107] Doubleday, N. Y. Med. Rec., Mar. 28, 1885, p. 343;—Heither, Med. Chir. Rundsch., Wein, 1882, S. 485;—Kühn, Deutsche Arch. f. k. Med., Bd. xxi;—Van Santvoord, N. Y. Med. Jour., Feb. 14, 1884, p. 201; et al.

[108] Louis, Jour. Am. Med. Ass., Jan. 19, 1889, p. 77;—Maragliano, La Riforma Med., Oct. 30, 1888.

[109] U. S. Marine Hospt. Repts., 1883, p. 234.

[110] U. S. Marine Hospt. Rpts., 1883, p. 199. See also Brudi, Allgem. Med. Cent. Zeit., Oct. 27, 1875;—Doubleday, Op. cit. p. 348;—Smith, N. Y. Med. Rec., Dec. 17, 1887, p. 768.

[111] U. S. Marine Hospt. Repts., 1884, p. 185. A case.

[112] See Loomis, N. Y. Med. Rec., June 5, 1889, p. 25, for a case.

[113] Hermann, Lungenentzündung., München, 1880, reports a case of hœmatemesis on the sixth day, with recovery. I have met with one case.

114 I have met two cases.
115 See Chomel, Pneumonia, Liepzig, 1841.
116 See Forest, quoted by Chomel, Op. cit., S. 167.
117 See Chomel, Op. cit., S. 167;—Cullen, Prac. Phys., Phila., 1792, Vol. i, p. 185.
118 Lépine, Op. cit., S. 153;—Mathy, Jour. Comp. des Sci., Méd. T. xxxvi, p. 394;—Dequesnel. Thesè de Paris, 1821, p. 14; et al.
119 See cases reported by Curtis, Boston Med. and Surg. Jour., May 11, 1876, p. 551.
120 See also Doubleday, N. Y. Med. Rec., Mar. 28, 1885, p. 343;—Peebles Am. Jour. Med. Sci., May, 1848;—Strong, N. Y. Med. Rec., Mar. 16, 1889, p. 291.
121 Especially in the aged.
122 It was particularly noticed by Aretæus. It was noticed in 12 per cent. of Speck's (Inaug. Dissert. Marb., 1870, S. 30) cases; very frequently in Wunderlich's (Inaug. Dissert., Tüb., 1858) experience, but rarely in that of Schapira (Inaug. Dissert., S. 42).
123 See Aetius, Medicinæ;—Chomel. Op. cit., S. 165; Cullen. Op. cit., p. 185;—Frank, Prax. Med.;—Rieverius, Prax. Med.:—Sennert, Prac. Med., Wittenb., 1635;—Wunderlich, Spec. Path.; Zacatus, Hist. Med. Amst., 1642; et al.
124 For further information see Doubleday, Op. cit., p. 343;—Fischer, N. Y. Med. Rec., Dec. 17, 1887, p. 162;—Fox, Op. cit., p. 172;—Juergensen, Op. cit.;—Lèpine, Op. cit., S. 768; Louis, quoted by Chomel, Op. cit. S. 145; Petit, N. Y. Med Rec., Nov. 5, 1887, p. 610; et al.
125 See also Dietz, N. Y. Med. Rec., Mar. 17, 1883, p. 290.
125 Traité de Méd. Prat., T. iv, Paris, 1843.
127 See Ashby, Lancet, 1884, Vol. i, p. 610:—Banti, Deutsche med. Wochenschr., Nr. 44, 1888;—Cullen, Op. cit., p. 183;—Doubleday, N. Y. Med. Rec., Mar. 28, 1885, p. 343;—Drake, On Fevers, p. 860;—Flint, Prac. Med., 1868, p. 305;—Huss, Lungenentzündung, Leipzig, 1861, S. 132;—Kühn, Deutsche Arch. f. k. Med., Bd., xxi;—Loomis, Pepper's Syst. Med. Vol. iii, p. 313;—Money, Lancet, 1890, Vol. ii, p. 818;—O'Connor, London Lancet, N. Y., 1858, Vol. i, p. 517;—Parkes, Med. Times and Gaz., 1860, Vol. i, p. 187;—Rokitansky, Path. Anat., Vol. iv, p. 111;—Scheef, Inaug. Dissert, Tüb., 1882, S. 16;—Sturges, pneumonia, 1876, p. 80, and London Lancet, N. Y., 1883, Vol. i, p. 411;—Todd, Med. Times and Gaz., Dec. 18, 1852, p. 611; —Trousseau, London Lancet, N. Y., 1855, Vol. ii, 135;—Van Santvoord, N. Y. Med. Jour., Jan. 24, 1885;—Waller, Inaug. Diss., Erlanger, 1877, S. 28.
128 London Lancet, Mar. 20, 1852.
129 Am. Jour. Med. Sci., 1861, and Op. cit. p. 180.
130 Caton, Lancet, 1884.
131 Op. cit., S. 132.
132 Op. cit.
133 Op. cit. p. 343.
134 Op. cit.
135 Phila, Med. News, Jan. 5, 1889, p. 7.
136 See also Chvostek, Wiener Jahrb., 1867;—Schapira, Op. cit.;—Stortz, Inaug. Dissert., Würzb., 1884, S. 64;—Samter, Inaug. Dissert., Breslau, 1881, S. 52;—Stecher, Inaug. Dissert., Leipzig, 1866, S. 28;—Speck, Inaug. Dissert, Marb., 1870, S. 47.
137 Alpinus, De Præragienda Vita, etc., Lugd., 1733;—Chomel, Op. cit., S. 244;—Colle, Cosmitor Med.;—Kühn Op. cit.;—Manlius, London Lancet, 1881, Vol. ii, p. 479;—Ozanam, Epidem. Mal., Paris, 1818-27;—Et al.
138 See also Ashby, Lancet, 1884, Vol. i, p. 560;—Roger, Mal. Enf.
139 Bolles, Boston Med. and Surg. Jour., April 13, 1876, p. 426;—Brinton, Lancet, N. Y., 1860, Vol. i, p. 485;—Chomel, Op. cit. S. 222;—Clark, Lancet, N. Y., 1856, Vol. ii, p. 293;—Green, Quain's Dic. Med., 1883, p. 880;—Huss, Op. cit., S. 132;—Jacobi, N. Y. Med. Rec., Mar. 17, 1883, p. 301;—Sturges, Op. cit., p. 93;—Trousseau, Clin. Med., Vol. i, p. 688;—Ziemssen, Pleuritis, etc., 1862, S. 198.
104 See Fuller, Lancet, N. Y., 1853, Vol. i, p. 64; Huss, Op, cit.; Ormerod, Op. cit.
141 This has been my individual experience and is affirmed by most writers on this subject. See Chomel, Op. cit., S. 222; Skoda, Zeitsch. d. Gesellsch. d. Aerzte zu Wien., 1852; Et al.
142 See Copland, Med. Dic., N. Y., 1855, Vol. xi, p. 215.
143 Skoda, Op. cit.
144 See Aran, Bull. de l'Acad. de Méd., T. xxi, p. 142; Trousseau, Clin. Med., Phila., 1873, Vol. i.
145 Radcliffe, London Lancet, N. Y., 1863, Vol ii, p. 716. For a similar case see U. S. Marine-Hospt. Rpts., 1887, p. 240.
146 The exudate has a slightly acid reaction. Speck, Inaug. Dissert., Marb., 1870, S. 47.
147 Money, Lancet, 1890, Vol. ii, p. 818, reports one case in which the sac contained twenty-four ounces of pus.
148 Todd, Med. Times and Gaz., December 18, 1852, p. 611.
149 Radcliffe, Op. cit., p. 716.
150 Alderson, London Lancet, N. Y., 1859, Vol. ii, p. 13.
151 Wilks, London Lancet, N. Y., 1863, Vol. xi, p. 716.
152 See Roosevelt, N. Y. Med. Rec., March 24, 1888, p. 323.
153 See Chomel, Op. cit., S. 222; Huss, Op. cit.
154 See also Chuckerbutty, London Lancet, N. Y., 1853, Vol. ii, p. 136.
155 Farre, London Lancet, N. Y., 1860, Vol. i, p. 143.
156 Alderson, London Lancet, N. Y., 1859, Vol. ii, p. 11.
157 Kirby, London Lancet. N. Y., 1860, Vol. i, p. 313.
158 Sibson, Prov. Med. Trans., 1844.
159 For further information consult Lejard, Rev. Méd., June 6, 1885;—Northrup, N. Y. Med. Rec., June 7, 1884, p. 651;—Roosevelt Hospt. Rpts., 1875, p. 25–1876, p. 25–1881, p. 20;—U.S. Marine Hosp't. Rpts., 1884, p. 187–191;—and treatise devoted to diseases of the heart. Muffled heart sounds do not necessarily indicate pericardial effusion. See case, U. S. Marine Hospt. Rpts., 1889, p. 334.
160 Lungenentzündung, Leipzig, 1861, S. 132.
161 Inaug. Diss., Würzb., 1880, S. 36.
162 Inaug. Dissert., Würzb., 1884, S. 65.
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164 Bramwell, Am. Jour. Med. Sci., July, 1886;—Clarke, London Lancet, 1884; Vol. ii, p. 263;—Fournier, Gaz. des Hôp.. January 30, 1886;—Gulliver, St. Thomas' Hospt. Rpts., Vol. xii;—Hopkins, N. Y. Med. Rec., February 6, 1886, p. 159;—Osler, Phila. Med. News, January 21, 1882, p. 80;—Peacock, St. Thomas' Hospt. Rpts., 1875;—Satterthwaite, N. Y. Med. Rec., February 27, 1886, p. 239;—Upshur, Phila. Med. Exam., 1841;—Wysskowitsch, Virchow's Arch. Bd. ciii, Heft 2; Et al.
165 See Gerhard, Dis. Chest, Phila., 1860, p. 379.
166 See cases by Féréo', L'Union Méd., 1879, Nos. 27 et 28;—Loomis, N. Y. Med. Jour., January 19, 1889, p. 78;—Duclos, Rev. Gén. de Clin. et de Thérap., Jan. 17, 1889.
167 U. S. Marine-Hospt. Rpts., 1886, p. 225.
168 See Homburg, Op. cit., S. 113.
169 Prudden, N. Y. Med. Rec., October 23, 1886, p. 469.
170 Butler, N. Y. Med. Jour. October 10, 1885.

ELECTRICITY IN GYNECOLOGY.

BASED ON AN EXPERIENCE OF OVER ONE THOUSAND APPLICATIONS.

Read before the Mahoning County Medical Society, February 13, 1893.

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The practice of gynecology, during the last two decades, has undergone more violent revolutions, perhaps, than any other branch of medicine.

But a short time ago it was believed and taught that displacements of the uterus were the foundation cause of nearly all pelvic troubles, and laboring under this delusion, but few cases of uterine disease could be properly treated without a carefully adjusted pessary. With nearly all gynecologists it was the *sine qua non*. To-day, the pessary is practically a thing of the past, and but seldom serves a useful purpose.

At one time the most powerful caustics were applied, without reserve, to the endometrium; but soon they were dropped for the milder ones, and still later, the hot water douche and glycerine or boro-glyceride tampon have nearly displaced them all.

At another time the lacerated cervix and perineum were the causes of all the ailments to which the unfortunate woman was subject, and operative procedure was the only remedy. The fallacy of such a claim very soon became apparent, and something else must take its place.

This and all other previous methods of procedure are to-day largely displaced by a sudden infatuation for removing the appendages of the uterus, a procedure which is already proving itself to be a futile effort to relieve the sufferer.

So many and radical changes in so few years can only be interpreted to mean one thing; and that is, results of none of the methods or lines of treatment have been satisfactory. I believe that the experience of those present will corroborate the following experience of the writer.

I have replaced a prolapsed uterus, carefully adjusted a pessary and followed out all the details in the general management of the case, and for a time felt secure in the belief that I had done much for my patient. So I had; but it was only to have her return to me in due time suffering from the results of the foreign body in the vagina, which served to fix the uterus more firmly, and thereby render it still more susceptible to injury by every misstep or jolt to which the body might be subject; perhaps she returns with increased tenderness of the uterus, a more profuse vaginal discharge than ever, erosions caused by the pessary, etc.

Or, may be, I have faithfully applied the glycerine or boro-glyceride tampon, in connection with a free use of the hot water douche, for from three to six months, once or twice a week, making my patient feel much better; but mortified in the extreme to have her return to me in less time than it took to relieve her, and find her in the same condition as when I first began to treat her.

It is in this state of gynecological science that we welcome to our aid a power which bids fair to remove from that branch of medicine an opprobrium which all must have painfully realized.

It is an energy as powerful for good as it is mysterious, and like all things in nature, equally powerful to harm when misapplied. As a therapeutic agent

in gynecology, we have come to regard it as the most powerful weapon against disease at our command.

In order to explain its therapeutic action in a large proportion of the cases which apply to the gynecologist for aid, it will be necessary to say something as to the pathology of these cases. The everyday patient that comes to your office seeking relief from miseries which she has suffered until she can endure them no longer, details to you a history something like the following: Backache, leucorrhœa more or less profuse, sharp pains in the region of one or both ovaries, perhaps, displacement of which she herself is conscious, headache, severe pain or a feeling of oppression on top of the head, nervous, irritable, sleepless and perhaps emaciated. She may also tell you that she has a strange feeling in her head as if she would go insane.

Many of the younger and ambitious gynecologists would diagnose the case as one of badly diseased ovaries, pus tubes, ovarian abscess, etc., and recommend castration as the *only means of saving the patient from an early grave* Especially is this conclusion reached without hesitation, if an examination reveals more or less tumefaction in one or the other side of the pelvis.

We do not wish to be identified with that class of pathologists. We do not believe that the ovaries or annexes are the primary seat of the trouble in more than an extremely small proportion of these cases. The trouble is, without doubt in my mind, primarily in the uterus. The endometrium we believe to be the point of departure.

A catarrhal inflammation is no doubt the first step in the departure from the normal condition, and with others, I believe microbic life to be an active agent here, whether as a cause of the catarrh or a result. In either case the trouble, once set up, is the least likely of all known disorders to be self-limited. The catarrh continues, congestion of all the pelvic viscera sooner or later follows, the uterus becomes enlarged to two, three or four times its normal size, and gradually the trouble steals along to the appendages, and there adds still more fuel to the flames.

If this is the correct pathology and course of many of these cases, what benefit could be expected from amputating the last to be attacked and smallest portion of the disease—the ovaries—and leaving the corner stone of the trouble—the uterus—remain? These facts explain to me the frequent failures to relieve the patient of symptoms, on account of which she submitted to undergo so great an ordeal.

I shall here introduce a brief history of a case illustrative of this point:

Mary ——, æt. 26 years, unmarried, has always been very corpulent, menstruation always very scanty. Has suffered pains more or less severe for a number of years; usually has had profuse leucorrhœa.

Electrical treatment was attempted, but being unable to introduce the intra-uterine electrode on several occasions, efficient treatment on that account not being given, the patient became discouraged, and asked permission to consult another physician, which was granted.

Only once while the patient was under my care, did I succeed in getting a sound into the cavity of the uterus, when it passed in about 3½ inches.

In less than two weeks from the time she was last at my office, the physician whom she consulted had removed a pair of atrophied ovaries. Before the operation, you will remember, her menstruation was always scanty. Since the operation, covering a period of more than a year, she has been unwell almost continually.

The patient's own words will best tell the story: "I had shed tears before the operation, but I have shed a great many more since." She now claims to have more pain than she ever had in her life.

What could you expect from detaching a pair of atrophied ovaries from a uterus large enough to allow a sound to enter three and one-half inches? Such a procedure, in my opinion, is putting the cart before the horse; it is like amputating a dropsical limb to get rid of the dropsy when the cause still continues to exist in some one of the vital organs.

The plea which I wish to make for this class of patients is that in electricity we possess an energy which is capable of curing the metritis, causing at the same time absorption of the hypertrophied tissues and tumefactions of the uterus itself, as well as the other pelvic viscera, causing also the uterus to contract and assume its normal weight and mobility, and sometimes position; and while this is going on the sharp pains in the pelvis, the soreness, feeling of weight, leucorrhœa, etc., and the much dreaded diseased ovaries, gradually vanish, thus relieving the patient, and that too without putting her life in jeopardy, or mutilating her body, but leaving her as nature made her, a woman and not a *thing*.

The action of electrical energy in these cases can be fully appreciated only by one who has seen and examined one of these patients before and after a systematic course of its application. The great change which takes place in some patients in a comparatively short time is almost incredible. In many others its effects are not as striking, but sooner or later, through care and perseverance, the results for which we are laboring will come.

A mathematically accurate and scientific explanation as to how this work is done cannot be expected from me at this time, inasmuch as no physicist has yet told us what this mysterious agent is. We know it only by its effects. We know that under certain conditions of matter, certain phenomena result, which we attribute to a something which we call electricity.

But, little as we may know of this energy in itself, and great as may be the changes in views regarding it in the future, the laws which govern its behavior are well understood and immutable

In accordance with these laws we are able to handle it, measure it, guide, direct and control it. Having then a thorough knowledge of the behavior of a current, and the necessary skill to manipulate, we apply it in the treatment of disease, and the results we obtain are substantially the only evidence we have that *anything* has been done. If then we fail to show just how this or that thing is done, our consolation is that we are no worse off than the physicist himself. Or, until you can explain just how quinine cures malaria, drug medication is no farther along than the treatment by electricity.

We shall content ourselves, therefore, by stating briefly what, according to our present state of knowledge, is believed to be the mode of action of the electrical current in the cure of pelvic disease, and stand ready to have these views criticised, upset or verified as investigation in this direction may advance.

The action of an intra-uterine application is not a single one. We have first, an action on the part which is in immediate contact with the active electrode, which is acid caustic with the anode and alkaline caustic with the cathode, the extent of cauterization being accurately controlled, and suspended

instantly at any point, a thing which is impossible when caustics are introduced from without. Not only is the action of the two poles different in that the one is acid and the other alkaline, but we have in the anode an unquestionable hæmostatic action, tending to arrest hæmorrhage, a sedative action calculated to relieve active congestion, inflammation and pain. The action of the cathode is directly the opposite; it increases the tendency to hæmorrhage, incites congestion, inflammation and pain. It is this stimulating and exciting action of the cathode that so often renders us invaluable service in the chronic forms of pelvic disease.

Besides this action of immediate contact, it is universally accepted that there is a decided interpolar action; *i. e.*, an action upon all the tissues included between the poles. In the case under consideration, this action affects the walls of the uterus, the cervix, all the appendages, and in fact no portion of the nerve and muscle supply of the pelvis escapes it.

To this action is attributed the absorption of the hypertrophied tissue, shrinkage and contraction of the uterus, dispersion of inflammatory products and tumefactions in the pelvis, thereby rendering a previously heavy and fixed uterus and appendages lighter and more movable, and thus affording entire relief from a trouble which seemed so formidable.

There is still another action of the electric current which has recently attracted some attention. A passing notice of it is all that space will allow. Some recent writers are of the opinion that some of the good results obtained from intra-uterine galvanism depend upon the power of the current, especially the anode, of destroying microbes. This power can easily be tested, and no doubt the question will soon be put beyond cavil.

Some of the more important special applications of the electric current in the cure of pelvic disease shall next engage our attention.

Uterine hæmorrhage is more certainly controlled by electrical energy than any other known remedy. In subinvolution with hæmorrhage, the swelling faradic current of low tension and slow interruptions, intra-utero-abdominal method, seems to me to be one of the most brilliant in its results of any remedy we possess. The patient can usually be cured in from two to five weeks.

I use the ordinary platinum intra-uterine electrode as anode in the uterus, and clay electrode as cathode on the abdomen. The application is made "swelling" and continued about ten minutes, of a strength up to the point of tolerance. In this use of the current I have never been disappointed. Moreover, the results are so quick in showing themselves that there is no room for doubt as to what has done the work.

I shall speak later on of its effects in hæmorrhage in uterine fibroids.

Menorrhagia and metrorrhagia as found in that everyday class of patients to which I have already referred, are usually best treated with the galvanic current. Unless the hæmorrhage is very severe, however, I usually disregard it, and strive to give the treatment best suited to the associated conditions, or the conditions upon which the hæmorrhage depends.

The history of the following case will illustrate a common phase of uterine disease, and I shall give, in detail, the history of the case with results.

May 29, 1890.—Mrs. B., æt. 39 years, married and has three children, youngest ten years old. Has been in ill health ever since last child was born. Menstruation has always been very free, but during the last five years, has often been alarmingly profuse. The periods are quite regular as to time. Suffers severe backache the most of the time, sharp, shooting pains in the region of both ovaries. Head symptoms have been very prominent. Pain and distress, especially in the back part of the head, sometimes on top. Ideas are confused and often has a feeling as if her mind would become disturbed; walking is difficult and sometimes impossible. During the last five years hæmorrhages have been so profuse as to require her to remain in bed from seven to twelve days every month. There have been periods of six months during which she has been unable to do any shopping up town, a distance of one-eighth mile from her residence. An examination revealed nothing strikingly abnormal except a uterus about three times its normal size. Treatment was instituted with a view of relieving pelvic congestion, and reducing the size and weight of the uterus thereby expecting to overcome the hæmorrhage and pain, as well as the constitutional symptoms resulting therefrom.

Intra-uterine galvanism was employed from June 29, 1890, up to Dec. 11, 1890, a period of five months and a half. During the first four months, there was slight improvement from time to time, but from this time on for the next six weeks I was able to use currents of much greater intensity and improvement was rapid. At this time, Dec. 11, the patient was feeling quite well, free from the ovarian pain and distressing head symptoms, as well as the excessive hæmorrhages, and the uterus about half its original size, and it was mutually agreed upon, that she should take a rest and see what would follow. Each succeeding period seemed to be an improvement on the preceding one, which improvement was progressive up to July 4, 1891, at which time she left the city to make her home in Pennsylvania.

The occasional reports I have had from her since then have been favorable. I had a letter from her husband September, 1892, in which he stated that his wife was well and doing all her own work with ease. He also stated that she had gone up in weight from 116 to 146 lbs; and that he could attribute the great change in her condition to nothing else than the treatment she had received at my hands. This has probably been the most tedious and trying patient I have ever handled, yet the final outcome was satisfactory, and no one will regret the time and labor spent.

One more case to illustrate a different phase of disease, and more rapid results:

Mrs. S., æt. 38 years. Married nine years, sterile, menstruation scanty, accompanied with distressing headaches, especially on the top of the head, severe paroxysmal pain in the left ovarian region and dyspeptic symptoms prominent. An examination revealed chronic metritis, leucorrhœa, abrasions surrounding external os, and an indurated mass in the left side of the pelvis about the size of a small lemon, shading off into the surrounding tissues.

The treatment covered a period of about eight weeks, viz: from June 25, 1890, to Aug. 18, 1890, during which time eleven applications were made. After six applications the abrasions about the os, and the mass of indurated tissue in the left side of the pelvis had entirely disappeared. Her menstruation following the eighth application lasted eight-days and never had as free a flow in her life. After eleven treatments she was dismissed as well.

It will not be out of place to repeat here that this lady had been married nine years and had never been pregnant, although she was very desirous of becoming so.

On December 9, 1892, she gave birth to a fine nine-pound boy.

Dr. Apostoli declares that when pus exists in the annexes, intra-uterine cauterization of from 80 to 150 m's. will positively not be borne. His experience

is sufficient to give weight to the declaration. I accept it as true.

In an experience of some magnitude I have personally met but few cases in which this current was not well borne, by carefully educating the uterus up to it. This demonstrates to my mind one of two things, viz: either I have had a very unique experience, or else *pus tubes* and *ovarian abscesses* are far from as common as many gynecologists would have you believe. Of course, they do exist, but certainly not in every woman who may have sharp pains in the pelvis or even tumefactions on one side or the other.

Paul F. Munde, in an article in the September number of the *International Journal of Surgery*, says: "I am convinced that in the past, many uterine appendages have been removed which, with a little patience and perseverance on the part of the physician and the patient, could have been saved. I see every year several hundred cases at least of this disease, and if I look back during the last fifteen years, I may well say that I have seen at least from two to three thousand women suffering from acute, subacute and chronic inflammation of the uterine appendages. It would not have strained my conscience very much if I had operated on, we will say, one-half of these cases; because in many of them the appendages were undoubtedly inflamed, adherent, and more or less enlarged; but I can say, and I believe with all due modesty, that I am proud of having operated only on sixty-three such patients, two of whom died, the rest making an uneventful recovery; I wish I could say as much of the ultimate results of the operation. In eight, menstruation persisted with increased intensity for from two to three years after the operation, and in a larger number of cases the pains for which the operation was performed continued with almost no improvement." Further on he says: "I have seen a tube which was the size of a small banana gradually diminish, shrivel and entirely disappear after several months of treatment."

"A lady from Buffalo consulted me eight years ago for as violent a salpingitis as I ever saw. Her ovaries and tubes were bound down, uterus absolutely immovable, the right appendages enlarged to size of an orange, and I felt obliged to tell her that an operation was imperative. She refused the operation, but insisted upon being treated. Local treatment with persistent local use of galvanism for months so materially improved this case that now she has been in very fair health for five years and has seldom been compelled to consult me or any other physician for her pelvic organs."

With the words just quoted I close this part of the subject.

Another important application of electrical energy in gynecology is for the purpose of relieving pain.

Dr. Apostoli, as well as numerous American gynecologists, are almost extravagant in their praise of the use of the high tension faradic current, with rapid interruptions, as an analgesic. My experience in this use of the current is comparatively limited, but I have seen enough of it to convince me that, with the proper instrument for the purpose, much good can be accomplished in this direction. Of all electrical appliances, however, there is probably none more difficult to procure than the instrument adapted to this use.

This instrument must possess two definite qualities in order to make it a success. It must produce a current of extremely high tension, and it must be constructed so as to produce rapid interruptions. The former quality is obtained from a very long and very fine secondary coil, and the latter quality depends upon the construction of the vibrator.

Dr. Hutchinson, of Providence, R. I., claims to have determined about the rapidity of vibrations necessary to obtain the best results. This he puts at 35,000 per minute, which rapidity will cause the vibrator to emit a musical tone which will correspond to first C above middle C. When the frequency is much greater than this, the current is no longer appreciable, and no longer has any analgesic properties. It remains to be seen whether or not other investigators shall verify the observations of Dr. Hutchinson.

I shall here introduce into this paper another use of the electrical current in gynecology, not on account of personal experience had with it, but on account of what seems to me to be of such practical importance that I am exceedingly desirous of having the matter before you for discussion. I refer to its use in ectopic gestation. I have reasons for believing that in electricity we have a power of converting what may later on prove to be a terrible catastrophe into an insignificant and harmless condition. Gynecologists in whom surgical tendencies predominate will advise laparotomy at once, or as soon as there is little doubt of the real condition of things. The procedure seems to me to be too radical and unwarrantable. Unless rupture has occurred, and provided it has not gone beyond the fourth month, there can hardly be a comparison. This statement is made on the following grounds: 1st. There is no possible condition which will in any way interfere with efficient electrical applications at the moment that ectopic gestation is first suspected. Thus we have an opportunity of taking advantage of treatment at a time when any method is most effectual, and when there is the least possible danger. 2nd. A current of a strength sufficient to destroy the life of the fœtus, when properly applied, can be administered without an anæsthetic, and if necessary, without an assistant, and without the slightest pain or discomfort to the patient, and does not require her to remain in bed more than several days or a week.

An attempt is often made to intimidate the advocates of this plan by holding out the possible danger of rupture during an electrical application. The facts are, however, that although many hundreds of cases have been operated upon in this way, I can find but a few reported deaths, in one of which puncture was used, at present considered highly improper, and the method in the other cases is not known. With modern methods the danger must certainly be exceedingly small, and not to be compared with the dangers of a laparotomy.

Although the length of this paper is becoming much greater than was expected, it cannot be closed without, at least, a brief reference to a subject that has been the source of many acrimonious discussions during the last few years. I refer to the treatment of fibroid tumors of the uterus by electricity.

When such men as Sir Spencer Wells, Thomas and Skene Keith, Playfair and Stevenson, of Great Britain, and Munde, Massey, Goelet, Martin and numerous others of this country, have substantially discarded the knife and adopted the Apostoli method,

claiming for it advantages over any other method, it will no longer do for men who have not tried the method to stand back, shrug their shoulders and wink at it, and try to console themselves by the antiquated idea that electricity in medicine is quackery. The question is no longer one of theory, but one of practical facts.

Not every tumor of the uterus is curable by electricity; but I believe that every *fibroid* tumor can be symptomatically cured.

Myomata, or the very soft variety of uterine tumors are not so much benefited by this treatment, and in this variety requires great care in its application.

But in the case of fibromata or myo-fibromata we may make the following claims without reserve: Intra-uterine cauterization, from 100 to 250 milliampéres, will arrest hæmorrhage, relieve the pain and reduce the size of the tumor, sometimes slightly, and sometimes greatly. In the case of small tumors I believe that they are often made to disappear entirely.

The almost absolute freedom from danger in this method of treatment may be inferred when it is known that Apostoli lost but two out of two hundred and seventy cases, and Thos. Keith in a large number lost but one.

I can do no better in this connection than quote a few paragraphs from a man who to-day stands, perhaps, unparalleled in his success in hysterectomy. I refer to Thomas Keith, of London. He says:

"What I now plead for is that for a time all bloody operations for the treatment of uterine fibroids should cease, and that Apostoli's treatment, as practiced by him should have a fair trial.

Hysterectomy, remember, which is performed every day for a complaint that rarely of itself shortens life, kills every fourth of fifth woman who is subjected to it. This mortality must cease; it is not a question of surgery, it is a question of humanity. Every time that a disease can be cured without resorting to a bloody operation progess is made in our art, and there is a gain to humanity; while surgery is the better for being purged of a deadly operation. It may seem strange to some that after the results I got in hysterectomy—results that almost made it justifiable—I should now begin to throw stones at the operation instead of trying still further to improve upon it; and but for Dr Apostoli I would now be doing so. I would give something to have back again those sixty-four women that I did hysterectomy for, that I might have a trial of Dr. Apostoli's treatment upon them. I have thrown over all surgical operations for this new treatment, and the longer I follow it the more am I satisfied."

In conclusion, I cannot refrain from anticipating some of the stumbling blocks that will naturally be hurled in the pathway of the sincere, earnest and efficient worker in this field of electro-therapy.

The application of electricity in gynecology does not differ in certain respects from any other art. Skilled work is not usually the result of *un*skilled hands, and nowhere is this more true than in the application of electricity.

Nor is this skill easily attained by every one. Certain requisites are indispensable to begin with. First and foremost there must be *earnestness* of *purpose*. Unless enthusiasm enters into the work failure must result. Other essentials are a thorough knowledge of the behavior of a current, a thorough equipment with apparatus and instruments, mechanical ingenuity, a hand capable of delicate and gentle manipulations, and a *bountiful supply of time and patience*.

In addition to this, there is such a thing as *special aptness* for certain kinds of work, and when this is associated with the other requirements mentioned, the claims we have made will certainly be verified.

The venerable and grand Dr. Robert Newman, of New York, who has so successfully treated hundreds of cases of stricture of the urethra by electrolysis, has been striving for years to force upon the profession at large just how he acccomplishes it, and yet we find men here and there decrying the method as inefficient and dangerous, claiming that they had tried it, and in some instances exposing their abominable ignorance by admitting that they had produced cauterization, and that the treatment was followed by a worse stricture than the one it was attempted to cure. We simply say that Dr. Newman does not cauterize with his own hand, and when some fool through his ignorance and clumsy manipulation does do so, neither Dr. Newman nor his method are responsible. It is the operator alone, and that too in spite of clear and explicit directions in every detail, laid down by Dr. Newman. Will a Lawson Tait or a Joseph Price submit to have the results of their laparotomies judged by the results of the operator who has killed half of his patients? By no means. We must distinguish between the *method* and the *operator*. They are entirely different factors. All we demand in this matter is fairness. We demand that each factor shall carry its own proper share of responsibility. We demand that you do not shoulder upon the method, responsibilities which belong to an individual operator.

SHOULD MEDICINE AND DENTISTRY BECOME A FUNCTION OF THE STATE?

BY C. S. BACON, M.D.,
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In these days when the functions of the State are somewhat rapidly increasing, so that we hear without amazement proposals that the State shall undertake to manage railroads and telegraphs, and the municipality shall furnish gas and electric lights and manage street railways, we may ask if this extension of governmental activity can effect the medical profession. The right of the State to interfere in the preservation of public health is now recognized. Quarantine laws, laws regulating medical and dental education and practice, building of hospitals and asylums, etc., shows that the State assumes certain medical functions. How far they ought to extend may well be a legitimate subject of inquiry.

I will omit that logically important portion of the discussion concerning the sphere of the State and assume that when anything can be better done by the State than in any other way, and that the greatest good to all is thus secured, then the State should undertake this task.

We notice at the start that there is considerable difference between preventive medicine and curative medicine. This difference, especially in the case of dentistry, is more apparent than real. But let us

take it as a basis of division and consider first preventive medicine and dentistry. Our first proposition may then be thus stated. Conservative dentistry and preventive medicine cannot develop except as a State function.

Is it necessary to elaborate the importance of conservative dentistry and preventive medicine? What proportion of dental work is plate work? How much of this could be prevented by proper and timely care of the teeth? How many that now lose their teeth before thirty years could retain them for life? How much ill health and disease sequent to digestive disorders could be prevented? How many years of life could be saved? How much is now lost to the community? The statement of these questions may suffice to indicate the importance of conservative dentistry.

Let us then turn to preventive medicine. Without assuming to give an exhaustive statement of its scope, let me call attention to a few of the things it undertakes to do.

First, it aims to absolutely prevent those diseases of infectious or contagious, *i. e.*, parasitic character, by quarantine, isolation and destruction of their causes, and, as fast as our knowledge permits, by producing artificial immunity.

Second, by securing freedom from adulteration and contamination of food, water and air, by attention to sanitation of dwellings, school houses, work shops places of public assembly, etc,, by careful regulation of occupations of dangerous character, it aims to procure such conditions as will best secure the individual in the possession of a healthy body, able to resist the attack of such diseases as cannot be banished, and withstand the ever present hostile influences of time and limitations of nature.

It is to realize more or less completely the last objects that State medicine, ever since there has been such a department of governmental activity, has aimed. To destroy infectious diseases was a dream that could hardly come to a sober practical man until within the last few years the immortal labors of Pasteur and Koch have paved the way of hope. Even now, however, when we contemplate the still imperfect knowledge of the life history of disease germs and the means of destroying them, our ignorance of the ways in which they are spread, the great obstacles to the sanitary control of the population in our large cities, it may seem idle to hope for such a result. Let me remind you how equally Utopian seemed the idea of an aseptic surgical operation, or the banishment of erysipelas and puerperal fever from the hospitals to one who, twenty or thirty years ago, lived in their germ infected wards.

Without spending more time in defining the scope of preventive medicine or elaborating its importance let us consider the proposition that preventive medicine and preventive dentistry cannot develop, except as a function of the State.

The general problems of sanitation, such as the sanitary disposal of sewage, prevention of contamination of the water supply and adulteration of food, etc., are now generally recognized to be the function of the State, and need no further argument. I will simply observe that sanitary provisions are very imperfect and will remain so until they are under the control of the medical profession, and that a State functionary. Is all the influence and wisdom of the profession brought to bear in favor of the best sanitary conditions? Is it not a fact rather that most of the energy of the profession is spent on curative measures and but little systematic effort made in preventing disease? Consider the epidemic of typhoid fever in Chicago last year. The sewage of one hundred thousand people is poured into the lake on the north shore. The intake tunnel, extending out about one thousand feet originally, is now still nearer the new made land, formed by all sorts of debris and refuse filling. Water was pumped from this intake and sent to our homes, poisoning with typhoid germs thousands, and killing twenty times as many as die from this disease in the great dirty city of London. Why was this done? Simply that the engineer might save coal and make a good record. It is easier to pump from the short tunnel than from the crib. Is the influence of the profession brought to bear on this sanitary problem? But why should the physician care for good sanitary conditions? He is financially interested in curing disease. Every case of typhoid fever is worth thirty to three hundred dollars to him. Are lawyers expected to advocate measures for decreasing litigation? Do undertakers lie awake nights thinking of means to decrease the death rate? Well, by our present system can one expect the energy of the medical profession to be concentrated on sanitary measures that would take away two-thirds of its income? The fault is in our present system under which the physician profits, as does the apothecary, by an increase in sickness. As a result sanitary measures are left in incompetent hands. The profession is poorly educated on sanitary problems; its attention is not given to these problems. This explains why such a dangerous system of sewage exists in Chicago. This is the reason why the Bridgeport pumps, which carry the sewage into the canal, are allowed to get out of order. This is why so serious a charge can be brought against the officials, a charge the truth of which is admitted by them, to the lasting disgrace of the fair name of our city. Until we have a medical profession well educated in sanitary problems, paid to prevent disease, and who should pay but the State, can we expect the enactment and execution of efficient sanitary laws?

The same question arises when we consider the second function of preventive medicine, viz: the eradication of infectious and contagious diseases. I shall consider the proposition that the eradication of these diseases can be accomplished only by the State assuming entire control in each case of the quarantine or isolation, the treatment and the measures of disinfection. Consider the condition at present existing in this State. Diphtheria, scarlet fever and small-pox must be reported and placarded. No pretence is made of attempting to prevent consumption and pneumonia. But in case of the diseases mentioned the measures taken are so absurdly inadequate as to be almost ridiculous. It is as if a surgeon should make a show of disinfecting the skin in a laparotomy and then work with dirty instruments and hands with filth under the nails. A statement of the sources of infection that are overlooked shows the impotence of placards, and at the same time proves the proposition that only the State can cope with the problem.

First, there are many cases of contagious diseases in poor families where physicians are not called, and which of course, are not reported. These are generally in the densely populated districts and become

fruitful sources of infection. The extent to which infection may in such cases extend has recently been demonstrated in the sweat-shop investigation, which revealed instances where cloaks and other garments that were being made at cheap rates, and soon to be sold in our large stores, were used to cover children sick with diphtheria and scarlet fever.

Next, many cases where physicians are called are not reported. Frequently great pressure is brought to bear upon the physician, to have him withhold his report. The parents of a sick child keep a store or boarding house. Well, it is to the interest of the doctor to please the one who pays his fee. The diagnosis is, therefore, left uncertain, and often, if the case terminates badly, the crape is on the door before the red card.

Then, again, the case has been reported and carefully isolated. The attendants conscientiously try to avoid spreading the contagion, but the physician himself must pass from the sick room to other patients. Has he some charm that keeps him from being a contagion carrier? Is not every physician almost certain that he has sometime literally carried disease, and often death with him? How can the State manage better? Leave the care of all contagious diseases to specialists who treat nothing else, who learn the technic of isolation as a competent surgical nurse learns the methods of asepsis, who are paid by the State and therefore independent of patrons, and called by those who need them most, the poor. These men shall also learn scientific measures of disinfection, shall learn where infectious matter resides and how it is rendered inoccuous. Then we should see less confidence reposed in a little harmless sulphur smoke, and little saucers of chloride of lime. Without such a system is there any hope of eradicating contagious diseases, and are not our present measures almost absurd?

There is one other function of State or preventive medicine in relation to contagious diseases that I must mention, for from the nature of the case it must be the work of the State, viz.: the artificial production of immunity by preventive inoculation. The recent work in the study of attenuated virus or the immunizing power of bacterial cultures under abnormal conditions of growth, gives ground for hope that the accidental discovery of Jenner may not remain alone; but that we may find protection against other diseases. Such extension of protective vaccination must come from the State. To prove it let me call attention to the great dangers of the present plan of allowing irresponsible individuals to supply vaccine virus. At present any one can run a vaccine farm. As a result, much of the vaccine in the market is impure and unsafe. So serious a matter is this that it furnishes some ground for the anti-vaccination sentiment that in some quarters is rather threatening. The State must soon assume a most rigid control of these vaccine farms. How much more important will be the question of control when we find preventive inoculation for scarlet fever, pneumonia and consumption?

The question of preventive dentistry is somewhat different from that of preventive medicine, in the fact that preventive dentistry, when developed, includes all dentistry. However great the development of preventive medicine, the physician must always find room for the exercise of his art in alleviating pain and supporting weak, overworked or worn out bodies. The dentist, on the other hand, may confidently hope for the time when he need not make the humiliating prognosis of death in case of the parts of the body committed to his care. I am told that in those parts of the city where, on account of ignorance or poverty, people pay but little attention to their teeth, four-fifths or nine-tenths of the dentist's work is in extracting and plate making, while dentists whose practice is among what is called the better classes, derive four-fifths of their income from filling. Hence it seems reasonable to say that when a way is furnished to extend the advantages of the dental art to all, preventive dentistry will develop to include practically all dentistry.

And so we come to a consideration of the probable effects of such a change of system, its merits and defects, the result to the community and to the profession. It may be taken for granted that what is for the best interests of the community is for the best interests of the profession in the long run, and what is harmful to the profession is not for the best advantage of the community. Hence, we consider the question of making the dentists and physicians (for the same problems concern both) State officers, by studying its effect on the community and on the profession; and naturally we ask first, how would it affect the profession?

It may be admitted that the new system would be for the benefit of the poor. We may admit that if a practicable scheme can be devised by which every family, no matter how poor, can have the best advice and education in the proper care of the mouth, and the services of a well educated and scientific dentist in the management of the teeth of the child, from infancy to manhood, it would result in a great decrease of painful disorders of the mouth and digestive diseases, and a great improvement of that important body of the community, the workers. But will the result be equally as fortunate for the profession? The character of a profession is determined, to a considerable extent, by the class, standing and character of the men who enter—the recruits. The inducements which determine a young man to enter the medical profession, including of course the dental branch, are its emoluments, the dignity which attaches to a learned profession, and the opportunity which such a profession gives for living a life engaged more or less in the prosecution of intellectual and scientific work.

Would the new system decrease the emoluments? Without making any attempt to work out in detail the organization of the medical corps in our proposed system, we must contemplate of course the gradation of physicians and dentists according to their experience, skill and ability to originate, direct and control, or assist and attend to details, and the necessarily consequent gradation in their remuneration. Yet it is not to be expected that any State employé can ever expect to receive the large fees, over ten or twenty thousand dollars, to which a few can now attain. On the other hand, many well educated, competent men, who perhaps are deficient in that business tact that now is so valuable to the ignorant and unscrupulous and boasting quack, and often so lacking in the first few hard years of the student, will be saved the bitter and sleep destroying anxieties of the first year's struggles with humiliating poverty. Would not this consideration attract to our profession a class of men better fitted to develop its scientific and

therefore its most valuable side? Are the men who make the biggest incomes our most valuable members? Is it not true that a certain kind of quackery is often involved in making the most money out of the business of medicine and dentistry? Has not much of the work in bacteriology, pathology and experimental therapeutics, that has so greatly advanced our art within the last thirty years, been done by men who are not counted among those with a fifty thousand dollar income, who in fact are often paid by the State?

The fact is, as J. S. Mill observes in his Autobiography, in congratulating himself on having a position in the East India House, that a definite, secure salary is one of the best conditions for good thinking. This leads to a consideration of another attraction to the recruits of our number, viz.: the chance to live a life engaged more or less in the prosecution of intellectual and scientific work. I shall freely admit that if a man aims for the high opinion of his colleagues he must do good scientific work, and that this competition is a great stimulus. But it may be claimed that this stimulus would not be withdrawn by assuring a salaried compensation. Indeed, the competition to scientific honors might be greater, as then, money compensation being fixed, no other compensation than that of increased reputation would be looked for. And how does the case stand with the young and poor member of the profession? Instead of wasting his time in more or less futile or humiliating expedients to increase his practice, by increasing his acquaintance through clubs and societies, studying the problem of combining economical living with keeping up pretences and denying himself books and necessary instruments, for the prosecution of his studies, he should be at liberty to pursue his own bent, secure of a comfortable living, and supplied with all necessary means of original investigation. Would it not be reasonable to look for a considerable increase in the total amount of scientific work by the profession? What induces our best students to teach in colleges and institutions? A salary, often too low, but fixed, with opportunities for intellectual work. And in spite of the isolated life of the army surgeon, the chance it gives for scientific work attracts to it many of our best men, who, like Sternberg and Billings, give honor to the whole country.

The third attraction for our medical recruit is the idea that he is coming to the dignity of a learned medical profession. Could the suggestion come to him that his dignity would be detracted from were he allotted to care for a district of poor foreigners, educate them in the uses of the tooth-brush, or teach them how to live to keep away diphtheria or cholera? If it is more degrading to care for the poor than the rich, the hospital physician suffers, the public school teacher suffers. But who that has had experience does not know that he is more apt to meet with inconsiderate treatment from a whimsical woman on Prairie Avenue, than from Milwaukee Avenue working people. And the unjust charges that we now have to meet, the annoying dismissals from some of our most interesting cases, is it not largely the result of the system that makes us the employés of individuals? Do we not waste time and self-respect, in humoring ignorant whims in order to keep the fees and influence of a "patron?"

Looking the matter squarely in the face, it must be admitted that the service rendered by the physician is a personal service, like that of a barber, or manicure, or valet. When the recipient pays for this service, he is apt to look on his physician as differing only in degree from his other employés. This is entirely changed in the new system. Here we become officers of the State, charged with the important duty of preserving the health of the members, and incited to prosecute the development of the science of life, which fact raises the dignity of our profession to as high a plane as man's intellectual and benevolent nature can carry him.

I will also call attention to the fact, that when a considerable number in any profession are lacking in the general culture of well educated gentlemen, when its ranks are infested with a horde of charlatans, and when the public understand that there are hostile schools, one as good as another, between which it must decide, the good name of our profession is inevitably lowered. Let all this pass away with the institution of such strict admission examinations as are now required of candidates for the army and navy medical service, and there must follow an appreciable improvement in standing.

For these reasons, we can promise that the new system will prove a benefit to the profession, by attracting to it a better class of recruits, and surrounding its members with conditions calculated to incite them to work for medicine as a science instead of as a business.

Is it equally as clear that the community would be benefited? Practical men look first to the pocket-book. Perhaps it may be urged that as our plan contemplates the support of the profession from the public treasury, it is unjust for the bachelor with sound teeth to pay a tax for the support of the dentist to care for his Blue Island Avenue neighbor's family of a dozen. This is the old objection to the public school system.

At the beginning I declined to discuss the sphere of the State, simply assuming its duty to provide for the general welfare in the best possible way. The increased popularity of accident and mutual and labor insurance is accustoming people to the idea of insurance, of which this plan is but an extension or development. And notice its great economical advantages. State dentistry means timely prevention of diseased teeth. I do not need to say how much is thus saved. Much also may be expected from preventive medicine. How much is saved by preventing one case of typhoid fever? How many hours of time to the physician and attendants? How many weeks of time and vital energy to the patient? Often, how many years of life full of the brightest possibilities? And now, how much of the physician's time and strength is wasted by having his practice scattered over miles of territory, when it might be limited to one block, and divided over the whole range of medicine, when it might be limited to a specialty. What an opportunity would the new system afford for an extension of the principle of division of labor by the development of specialties. And how much is lost when the physician or dentist of valuable experience and skill is obliged to attend to time-consuming details that might be left to younger assistants. I believe it very safe to say that one-fourth the number of physicians now in Chicago, could easily care for the health of the city under the new plan.

I will notice only one more thing concerning the

way the community would be affected by the adoption of this new system. Will Mr. Jones be satisfied to have the State furnish him a physician and dentist, just as it supplies a teacher to teach his children? Probably he prefers to choose his own doctor. Well, if he is poor and has to go to the county hospital, he must accept the physician in charge. That is all right; but if he is rich it is a different matter. He may fancy that Dr. Smith is a better aseptic surgeon or dentist than Dr. Brown, and object to being consigned to the care of the latter. Perhaps some way may be arranged to let Dr. Smith have charge of the Prairie Avenue district. In the Methodist Church each individual is not allowed to choose the doctor for his soul, yet I have never heard of Dr. Bristol or Dr. McIntyre being sent to Podunk and plain Pastor Dryasdust being assigned to Trinity Church. We may learn to manage as well. But I must again call your attention to the fact that the family physician will be much less important under the State *régime* than he is now. The sanitary officer will be responsible for perfect plumbing in the house, and uncontaminated air and unadulterated food and drink. The vaccinationist, from his perfect laboratory, furnishes immunity from small-pox, scarlet fever, pneumonia and consumption. The visiting doctor, then, has often little more to do than to decide upon what specialist the patient shall call.

In presenting this subject, I have unwillingly been placed in the position of an advocate. Knowing that nearly every one to whom it is new, looks upon it as absurd, and sees only the objections that arise, I have been obliged to meet these objections in the style of an advocate. I have not attempted to say how the State shall organize its medical corps. I have only asked, is it reasonable that the State should assume the function of medicine? By establishing the propositions that preventive medicine can develop only as a function of the State, and that both the profession and the comnunity would profit by making all medicine such a function, I have completed the proof.

SALISBURY DIET AS AN AID TO THE CLIMATE OF COLORADO SPRINGS, IN THE TREATMENT OF PULMONARY CONSUMPTION.

BY E. C. ATKINS, M.D.,
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The beneficial effect of Colorado climate on pulmonary consumption is too well known to call for comment, and that nearly all hæmorrhagic cases either recover entirely or are greatly benefited by residence in this altitude, is a well accepted fact, as hundreds of now well men, who came here for hæmorrhage of the lungs, will testify.

But with catarrhal or fibroid cases the results obtained by climate, while encouraging, are not so universally good. Many of this class, it is true, recover entirely or live in comfortable ill health for indefinite years; but we are all forced to recognize the fact that a large percentage of this class of cases do well only for a short time, if at all.

They improve for a while, perhaps a few months, possibly a year or two, but the disease is not arrested. Sooner or later, for some reason not always apparent, they begin to lose ground, the appetite fails, hectic reappears, diarrhœa is frequent and the patient steadily fails in health in spite of all the efforts that are put forth to save him.

It is very difficult, if not impossible, to arrest the downward course of such cases with climate and medicine. The stomach, which is our sheet anchor, having failed, we are powerless to prevent the progress of the disease toward a final and fatal termination.

But it is in just this class of otherwise hopeless cases that the Salisbury beef diet proves to be of the greatest service. It takes up the patient at his weakest point, his stomach, giving tone to that organ, stopping nausea and diarrhœa, restoring that greatest of all blessings to a sick man, a good appetite, and eventually bringing him back to health and vigor. Under its influence the appetite becomes enormous; the patient who sickened at the sight of meat, now eats three or four pounds a day. The veins fill out and the red corpuscles of the blood increase many fold, a healthy glow suffuses the face, the nerves become quiet and steady, the muscles increase in size, and the general improvement is so marked as to be most gratifying to both patient and physician.

Let those who doubt the efficacy of this mode of treatment try it thoroughly. One case will be a revelation to them. Climate cures many, but let not those whom climate and medicine fail to cure be discouraged, for the pure and dry air and constant sunshine of Colorado, aided by such abundant nutritive and hygienic measures as are brought to bear by the Salisbury treatment, make a combination which rarely fails to bring comfort and a large degree of health to the otherwise discouraged and hopeless consumptive.

The following cases will speak for themselves:

Case 1.—A physician, 35 years old. Came to Colorado two and a half years ago with chronic catarrh of the right apex. Dullness and moist râles present over same area. Bad cough, muco-purulent expectoration containing abundant tubercle bacilli. Did well for two years, and then without apparent cause began to decline in health. Had fever every afternoon, great loss of strength and flesh, sat up only part of the day. Entire loss of appetite, loathed the sight of food. Was eating nothing but milk and soups. No solid food. Great nausea after eating and constant watery diarrhœa. All the usual means were used to stop the diarrhœa and improve the appetite, but without appreciable results. The patient was going rapidly down in spite of medicine and climate. Began the Salisbury diet as a last resource.

End of two weeks.—Diarrhœa stopped, nausea ceased, has less repugnance for food and is eating one pound of beef pulp a day.

End of four weeks.—Fever gone, has good appetite, strength increasing; general appearance much improved. Is out of doors all day.

End of eight weeks.—Has a *splendid* appetite, eating two pounds of pure beef pulp a day and enjoys it. Has stopped whisky and all medicine and is gaining rapidly.

End of four months.—Still improving and has gone to work; does four hours office work a day. Looks perfectly well. Only remaining symptom is a little cough in the morning.

End of six months.—Remains well, eats about four pounds of meat a day. Is the picture of health and working regularly.

Case 2.—Clergyman, age 33. Came to Colorado three years ago for asthma. Asthma somewhat better since coming out, but for a year past his general health has been steadily failing. Has bad cough and abundant muco-purulent expectoration. Is greatly emaciated and very weak. Has some fever afternoons; entire loss of appetite. Is very much discouraged and thinks he must give up his church and make a change.

Physical examination shows râles at both apices; slight dullness and hoarse respiration over same areas. Was advised to stay where he was and try Salisbury diet.

Partial result after nine weeks.—Has adhered strictly to the

diet for nine weeks, and kept at work all the time, though feeling weak. Appetite splendid. Is eating two and a half pounds of pulp a day, and enjoys every mouthful of it. No fever. General appearance much improved. Cough and expectoration *entirely gone*. No asthma for eight weeks.

Case 3.—Aged about 35. Came here on account of cough following the grippe a year before. In Colorado several months with only slight improvement. Physical examination shows dullness at right apex, and mucous râles all over upper lobe of left lung. Has a bad cough, and very abundant muco-purulent expectoration. Tubercle bacilli present. Is emaciated and weak, and discouraged. Eats no solid food, complete failure of appetite, living on broth and liquid diet. Fever every afternoon, constipation, skin and eyes sallow. Is very nervous and looks very sick.

Began Salisbury diet eating one pound of pulp a day.

Nine weeks later.—Appetite enormous; eats three and a half pounds of beef a day and is hungry all the time. Fever entirely gone, nervousness has ceased. Is much stronger. Sallowness disappeared, face is bright and rosy. No constipation. *Cough diminished to one-third.* Expectorates only in the morning. General appearance greatly improved; looks like a well man, and wants to work. Can walk two miles without fatigue.

Case 4.—Aged about 40. Came to Colorado three and a half years ago with bad cough, and the symptoms of consumption. Did well for a year, then began to run down steadily. Had fever every day, entire loss of appetite. Cough very bad both day and night. Abundant expectoration containing much pus and many bacilli. Great loss of strength and flesh. Eats almost no solid food. Is under a good physician who orders him to live largely on meat food, but cannot swallow it. Is taking large quantities of whisky, also hypophosphates, charcoal and other remedies to tone up the system and aid digestion. In spite of it all is failing steadily.

Physical examination shows catarrhal phthisis of one apex. Fully believing he cannot recover he is arranging his affairs and getting ready to die.

Began Salisbury diet. Now, six months later, he looks like a perfectly well man. All symptoms have disappeared except some cough in the morning. Does not cough all day long. Has a magnificent appetite and lives wholly on meat. All fever has gone, he has gained in weight and feels strong and well. Is working out of doors and superintending a large business requiring much mental work. Gave up all whisky and medicine in about a month after beginning the diet. Needs nothing of the kind now.

These cases are none of them completed as yet, but the progress made in each shows how largely the treatment of phthisis depends upon proper nutritive and hygienic measures. Given a *means* of administering nitrogenous food and the battle is half won.

SOCIETY PROCEEDINGS.

American Electro-Therapeutic Association.

Second Annual Meeting, held in New York, October 4, 5 and 6, 1892.

WILLIAM J. MORTON, M.D., PREST.

SECOND DAY, OCTOBER 5—MORNING SESSION.

(*Continued from page 312.*)

I could not purchase two faradic coils that were of the same length, size of wire or resistance per foot, and no two rheotomes gave the same number of interruptions per second. The best that I had been able to obtain was one made by Flemming, of Philadelphia, which produced between 1,100 and 1,200 strokes to the minute—the usual speed being about 700 or 800.

Believing that an instrument could be devised which would produce interruptions of an electrical current vastly exceeding 1,200 per minute, and that such device would cause the desired result of curing pain by paralyzing terminal sensory nerve loops by such swift movements—in effect, a series of slight electric shocks or blows, I began to experiment.

It was necessary, however, first to be satisfied that similar blows, apart from any electrical connection whatsoever, might not do what was wanted; and rapid percussion with small hammers on elastic handles, which I had seen used by my friend Dr. Douglas Graham, the masseur, came into my mind. So the following test was made:

Upon the rim of a wheel ten inches in diameter, a series of small elastic hammers was arranged, each weighing a few grains, and attached to the end of an elastic shaft of whalebone three inches long. This wheel was made to revolve by a small electric motor, at such a speed that any spot upon the surface of the body might receive a succession of blows of ten grains weight apiece with a rapidity of 400 per second.

A few experiments with this machine proved that blows alone, no matter how rapidly given, were not sufficient to paralyze sensation or materially change the power of nerves of conductivity of impressions.

Therefore the idea was abandoned, and my own mechanical skill being insufficient to arrange any means of obtaining a series of electrical interruptions as rapid as my little hammer blows, I was forced to lay aside for a time my hopes of relieving pain with the induced current.

A little later, however, an instrument was brought to my notice which contained, among other improvements, the valuable ones of separate induction coils for motor and sensory effects, together with a device whereby the object which I had been working for, exceedingly rapid interruptions of current, was attained.

Both coils were accurately measured, tested for resistance, and so marked that, by carefully using a graduated scale attached, one could tell how much of either coil was in circuit, and how much resistance the current encountered before leaving the coil.

The rheotome was an elastic, thin metal riband, made fast at one end to a strong post, and at the other attached to a screw lever whose threads were so fine that a single revolution advanced the screw point one-fourth millimetre. Initial electric pressure was furnished by three Barney dry cells, which, although generally as unreliable as all other dry cells, proved, after many trials, the best for this purpose, as they developed a low initial pressure with considerable internal resistance and corresponding lack of tension.

At first, I found it difficult to count the vibrations of the riband; in fact, was unable to do so until it occurred to me that every note of a musical scale is produced by a certain number of vibrations per second, which had been accurately computed and was known. When the riband sounded the note C major, by referring to a table of scale sounds, I found that its speed was 540 per second, or 32,400 per minute, and that this speed, which was capable of being increased by stretching the riband tighter with the screw lever, could be run up to 50,000 per minute, then giving a note which corresponded closely to G sharp of the scale.

In order to be quite certain as to the varying speed of vibrations of the riband at different tensions, I sent to Leipsic and procured a pair of scale tuning forks, which give every note of the chromatic scale by means of sliding weights attached to the arms of the forks. Thus, when the sound emitted by the riband corresponds to that of the fork, and the latter marks a certain note, the number of vibrations in each are the same and may easily be computed.

A peculiar phenomenon that occurred during the progress of these experiments was that a high note was accompanied by an exacerbation of pain. That is to say, if the tuning fork registered a sound above D, harm rather than good was likely to follow the application; whereas, if it were kept steadily at C, the marked anæsthetic effects of the current were produced and maintained.

I can offer no other solution for this than that the effect of the succession of blows of greater rapidity was not transmitted far enough along the nerve trunks to which they were applied to be of much use. In other words, that their rapidity was so great that the result was rather that of a constant current than an interrupted one. I may also mention here that, unless the current was improperly strong, no muscle contraction followed, and that the fact of such contractions being produced has commonly served me as a guide in graduating current strength.

A careful and thorough course of clinical studies was at once instituted to determine the value of this novel idea, and after several months of testing in varied cases of annoying pain, I found that a combination of electricity with small rapidly repeated blows struck upon the surface by swift interruptions, was sufficient to arrest pain in every case where organic change in nerve or other tissue had not commenced, and after a varying number of applications, to cure it.

Arguing that if this rapidly interrupted faradic current possessed the power of relieving pain, it must do so by paralyzing the sensory fibres of the nerve leading to the painful part, and that if this suspension of sense could be maintained for a few minutes, or even less, it would result in its temporary loss in the part to which the current was applied, I began to experiment for production of anæsthesia.

The positive pole of the secondary coil of the instrument was placed in a basin of salt water, in which my left hand was also immersed, the negative pole pressed on the middle of the forearm and the current started. When a speed of 540 vibrations was reached, as indicated by the riband sounding the key of A major, a sensation of numbness was felt in one minute, and in three more was so complete that a sharp tap upon the hand, or a pin prick on any part of the immersed surface, could scarcely be felt.

The current withdrawn, sensation returned more quickly than it disappeared and in two minutes there was nothing about the limb to indicate that it had been experimented upon.

Similar tests were to different parts of my own body, and to others, with an unvarying result of local anæsthesia more or less complete, always, however, of short duration.

While these experiments were progressing, a medical friend, who had been watching them with some interest, brought to my rooms a patient with a felon on his left forefinger, to try if he could open it painlessly by the new method. Instead of immersing the finger in water and transmitting the current through that medium, I placed it in a metal tube partially filled with bits of soft sponge, wetted with salt water. The finger was carefully packed therewith, and the rheotome started with one-third the secondary coil in circuit.

The note reached was, as before, A major, answering to 540 vibrations per second. After one minute, the speed was increased to 720 a second, sounding the note of G sharp, and held at that point for two minutes longer.

The finger was then removed from the tube and examined for sense. To our disappointment a touch upon the felon was nearly, if not quite, as painful as before, and I made up my mind that our failure was due to the fact that interruptions were too rapid. So the finger was replaced in the tube and current started with the same resistance in coil as before and a vibratory note of C, and in three minutes surface anæsthesia had been produced sufficiently profound to allow the felon to be cut with no more sensation on the part of the patient than if it had belonged to another person.

The next test was a case of facial neuralgia, genuine tic-douloureux, in the person of a physician's wife, who was such a constant sufferer that she was quite willing to submit to any experiments that promised relief. In the height of her paroxysms the neuralgia pain was severe enough to swell the eyelids so she could not see, and to interfere with circulation to such an extent that parts of her forehead were almost black. As soon as the attack was past her face resumed its natural appearance, and she usually had no farther trouble for a month, the accesses corresponding to menstrual periods.

When she came to my rooms in May of this year, a trial application was made of galvanism with an initial pressure of twenty volts and a resistance of 6,000 ohns, continued for twenty minutes. No relief followed. Static electricity was next used, both with short currents from wood conductors, and fine sparks from metal points; also fruitlessly.

I then commenced the measured coil and high speed interrupter, placing the negative pole under the nape of the neck, and the positive, a flat sponge three inches square, upon the forehead, with low riband tone C major. In five minutes she said the pain was less; in ten it had disappeared; and after keeping electrodes *in situ* five minutes longer, the lady was left to enjoy an hour's sleep—the first in two days. From that time to the present—the middle of September—there have been two returns of the disease, both of which were relieved in the same way and by the same instrument. She thinks, and her husband coincides, that at last a remedy has been found for her trouble that is safe and sure.

I have not had any further opportunity to test the value of this current in surgery, my work being largely medical, but shall not neglect a chance to do so.

At the May meeting of the Providence Medical Association, in response to an invitation from its worthy president, I demonstrated this form of anœsthesia before the Fellows to the best of my ability, and was fairly successful. Several of the men present offered themselves for experimentation, and were able to notice distinctly the benumbing effect of the current upon those parts of their hands exposed to it. All this is yet in its infancy. The idea of extremely rapid, carefully measured and counted electrical interruptions of an induced current for relief pain and for local anæsthesia is now in the hands of thoroughly competent, practical mechanics, who may be trusted to bring out such improvements in instruments as may, at some time in the near future, make it as accessible to the profession at large as their collection of anæsthetic drugs are to-day.

I beg, therefore, to submit this contribution to the papers on medical electricity which are to be presented at this meeting of the Association as, to some extent, a bit of original work, and hope that I have succeeded in drawing the attention of my colleagues to what seems to me an important point, with sufficient skill and force to induce them to look it up still farther.

Discussion.

Mr. Carty said that the behavior of the current was quite apart from the speed of the interruptor, being dependent upon the quality of the core, its amount and disposition, the number of turns of wire, and various other factors, and, therefore, if at any time, failure should be met with, one should not be discouraged until it has been positively determined that the periodicity of the current is in exact accordance with the periodicity of the vibrations of the reed. Electricians have met with such obstacles in their work, and have carefully investigated these points. Although not a difficult procedure in a laboratory to determine whether or not the periodicity of the current and that of the reed is the same, he could not suggest any easy and practical method by which the medical man could apply such a test.

Dr. Goelet said that he had several primary coils which gave very different results with the same secondary coil placed over them, and he had believed this was due to the difference of the quality of iron in the core, as well as to the construction of the coil itself.

Dr. Kellogg said that very rapid interruptions of the current could be measured by tracings made on a very rapidly revolving cylinder.

Dr. Goelet said that all faradic currents varied in their physiological effect with the relation of the tension and volume of the current. If the current is derived from a fine wire coil, there is a high voltage but the volume is small; if from a coarse wire coil, the amperage is increased and the voltage diminished. With the current of greater amperage, greater muscular contraction is produced, provided the resistance is appropriate in the parts between the poles. That is in using a current with a diminished electromotive force, there must be a diminished resistance, in order that the volume of the current may be appreciable. The speaker said that his work was mostly gynecological, and that consequently both poles were ordinarily used on moist mucous surfaces where the resistance is very low; as a consequence, the effect of a coarse wire coil with its current of low voltage is very appreciable, whereas the current from the same coarse wire coil when applied to the surface of the body, where the resistance is much greater, would produce scarcely an appreciable effect.

Dr. Nunn said that he had been working in very much the same line as Dr. Hutchinson, and he was glad that the author had conceived the happy idea of using the ribbon for a rheotome. Some years ago, it would be remembered, Mortimer Granville made some experiments on the effect of rapid percussion upon sensation. The speaker had repeated these experiments, but had not obtained the same results. At the last meeting of the Association he had suggested that pain was in some way an alteration in the vibrations of a nerve, and according to this theory the results described in the paper would be explained by supposing that the vibrations corresponding to the note C major neutralize the disordered vibrations of the affected nerve. If this view be correct, the character of the current itself is not of much practical importance.

Mr. Carty said that he had just thought of any easy method of determining the relation of the periodicity of the current to that of the vibrator. When two plates connected with the terminals of a secondary coil are brought close together; they will attract each other, and you may actually have a percussion taking place between these two plates. This view suggests that the method of treatment under discussion may actually furnish a means of reaching the part mechanically, and of producing there an internal percussion. If a Dolbear telephone, which consists of one rigid and movable plate, be connected with these terminals, it should give out a certain note, and if this corresponds with that emitted by the vibrating reed it would prove that the periodicity of the current and of this reed was the same.

Dr. Nunn said that when a muscle contracts under the influence of a current there is undoubtedly a percussion produced, the degree depending upon the kind of current, and it is probable that such a percussion takes place throughout the cells of the body.

Dr. Herdman thought a purely mechanical explanation was sufficient to account for the action of Dr. Hutchinson's apparatus. He had seen in a recent periodical an account written by Dr. Morton of a vibrating machine devised for the relief of pain in the head, which was now being tried by Charcot. He had in his possession a book published fifteen or twenty years ago in which there is an elaborate discussion on the power of musical tones to relieve tones. Certain vibrations are produced through the auditory nerve upon the sensorium, and a certain tone may be selected which is most agreeable to the patient. Hence it would seem that we can simulate the normal vibration of a nerve by means of such an apparatus as that described in the paper.

Dr. Dickson said that he had very recently learned that an electrician in Toronto had sold three phonographs which were intended for use in the treatment of certain ear affections. It is to be remembered that electricity is only a form of motion through the molecules.

The president said that the description of the vibrating apparatus now being used by Charcot was first published in *Progrès Medicale*, and he had not written the article in question, but had only alluded to it. The suggestion made by Mr. Carty was a most valuable one, for if it be found that the note emitted by the Dolbear telephone does not accord with that given out by the reed, we can make the periodicity of the two coincide by adjustment of the reed.

Dr. Hutchinson, in closing the discussion, said that it was unfortunate that medical men must deal with many uncertain and unknown factors. He doubted if we would ever know more than the simple clinical fact, that this method relieved pain; and while he had been greatly interested in the physical explanation which had been given, he thought it made but little difference about the number of vibrations so long as the pain was relieved. If we only had to deal with certainties, we might then consider the apparatus apart from the human body, but this cannot be done in medical practice. In order to eliminate any possible effect from the influence of musical tones, he had had the instrument placed in his cellar, where the sound from it could not reach the patient's ear, but the result was just the same. By this method local anæsthesia can be produced with the greatest ease, but so far the area of anæsthesia is only under the electrode, and for a zone about one inch surrounding it.

SOME PHYSIOLOGICAL EXPERIMENTS WITH MAGNETS AT THE EDISON LABORATORY.

By Frederick Peterson, M.D., Chief of Clinic, Nervous Department, Vanderbilt Clinic, College of Physicians and Surgeons, New York, and A. E. Kennelly, Chief Electrician Edison Laboratory, Orange, N. J., Vice-President of American Institute of Electrical Engineers.

Magneto-therapy has not gained such wide-spread application as has electricity in medicine, nor has it won to any great extent the confidence of the medical profession, for its effects are even more occult and less easily demonstrable than, for instance, the trophic influences of galvanism in poliomyelitis and progressive muscular atrophy. At the same time, magneto-therapy has its adherents and earnest promulgators, to which any one will bear witness who has observed the transfer of singultus by a magnet from one girl to another in Charcot's dramatic realms at the Salpêtrière, or who has at the Poliklinick watched Benedikt carefully adjust a one-foot horse-shoe magnet to the hyperæsthetic spine of a hysterical girl. There are many lesser men than these who have implicit faith in that mysterious force, and there is no dearth of theories to explain the effects of magnetism upon the human organism. Prof. Benedikt has taught that erethetic forms of hysteria are better treated by the magnet than by electricity, hydrotherapy, or drugs. A magnet being applied to the sensitive vertebræ, without removal of the dress, the irritable patient soon becomes quiet, and even quasi-paralyzed. The magnet, therefore, "increases the resistance to conduction in the motor nerves." The muscles gradually relax, the respiration becomes sighing, consciousness slowly disappears; the resistance to conduction in motor nerves "could easily

become absolute." The two poles have different effects. Sometimes one pole to a hyperæsthetic ovary fails to relieve pain, whereas a change of the poles causes its speedy disappearance. According to him, the magnet must be employed with due caution, since patients may be injured by it.

The status of magneto-therapy in America may be inferred from some quotations from the third edition of Roberts Bartholow's "Medical Electricity," 1887. Under the caption of "Physiological Effects of Magnet Applications," he says: "We know that a current circulates in a magnet. If a powerful horse-shoe magnet is brought near to the skin, opposite electricities are attracted to the poles, and currents are induced. About the point of application, therefore, the skin will be acted on directly by the magnetic current, and by an induced current. The production of physiological effects, which can be recognized, is therefore, merely a question of the magnetic strength."

He then quotes Dr. Vansant as assuming the body to be dia-magnetic. "By applying north and south polarity to different parts, very extensive subjective impressions are experienced. They are of two classes—of heightened organic activity and the opposite condition."

He then adds: "That impressions of a very decided kind are produced by the application of strong magnets is evident in the experience of Drs. Proust and Ballet, who continued a course of investigation begun by Charcot at Salpêtrière." They ascertained that magnets could not be applied with impunity, for if applications were prolonged, pains were felt in the epigastrium and the thorax, making respiration painful. Digestion was disordered and boulimia brought on. These results were so uniform that there seemed to be no doubt of their genuineness in the minds of the investigators.

Under the heading, "Therapeutic Application of Magnets," Dr. Bartholow quotes Dr. Hammond as preferring a horse-shoe magnet, and advising that several of the same size be kept, so that by clamping them together more power can be obtained. The author adds: "Hammond insists on the necessity for the application of both poles in many cases, and therefore uses the horse-shoe magnet."

"Hammond has used magnets in nine cases of chorea, in two 'complete cures being produced in a few minutes.'"

"In two cases of hemiplegia with hemianæsthesia, Hammond had very surprising results from the application of horse-shoe magnets, the sensibility returning immediately, and in one the hemiplegia was recovered from in a few hours."

The magnets used by physicians are generally those of a horse-shoe shape, varying from a few inches to a foot in length, and are the so-called permanent magnets. They exert a traction force equivalent to several ounces, and sometimes to from one to three or four pounds.

Electro-magnets can be made to sustain 200 pounds to each square inch or 14 kilograms per square centimetre of active surface on either pole. That is to say, 28 kilos to the square of active surface on either pole if both poles are alike and share the load.

While rather skeptical as to the practical utility of the magnet in medicine, it occurred to us that if there was any truth whatever in the claims made by various distinguished authorities, if this interesting and undoubtedly powerful force had any effect at all upon living organic matter, we were in a position to demonstrate its physiological effects by means of magnets of enormous power placed at our disposal at the Edison Laboratory at Orange, N. J., through the kindness of Mr. Edison. Accordingly we made experiments which we detail below, and which we consider as conclusive, in that they have been made with magnets of a strength possibly never before used for such purposes. The description of the magnet employed for preliminary experiments is as follows, (fig. 1):

It is of wrought iron throughout, and its principal dimensions are represented in the sketch in centimetres. Roughly speaking, it is about a foot and a half wide by two feet long and requires two men to lift it. The cross section of the core is 49 sq. cm. The vertical angle of the cones is 36°, and the diameter of their plane faces 0.75 ctm. There are 2,728 turns of wire on each limb, making 5,456 in all, and the current employed in exciting it was approximately 4.5 ampères. The pole faces were 1.20 ctm. apart, and it was between them that objects were placed for observation either with the naked eye or with the microscope. The intensity of the magnetic field between these poles was about 5,000 C.G.S. lines per square centimetre.[1]

A drop of water placed on a glass slide in this field was visibly distorted in shape by the magnetic force.

The stage of the microscope was removed and wooden supports substituted. It was necessary to clamp the microscope down to the table to prevent its being drawn upward to the poles.

Nothing peculiar was noted in the effect upon iron in its finest powdered form, iron by hydrogen. It behaved just as iron fillings would do, being strongly attracted. Iron by hydrogen placed in water was observed to be polarized by any ordinary magnet under the microscope.

Dry powdered hæmoglobin exposed to the strong magnetic field above described was not visibly affected by it. The iron it contains, however, is exceedingly minute (0.42 per cent.).

It was then thought possible that the iron in loose combination with fresh hæmoglobin in the blood-corpuscles might be affected. Several experiments were made with both human and frog's blood. The blood placed on slides and covered with a cover glass was subjected to the strongest magnetic influence obtainable, and failed to show the feeblest traces of polarization, movement, or vibration.

It must be borne in mind that we were using an electro-magnet which we magnetized and demagnetized at will. First one would make the observations, the other experimenter attending to the current; then they were repeated and verified by the other on our changing places.

Living ciliated epithelium from the pharynx of a frog was now in like manner subjected to the magnet, and its behavior watched under the microscope with a high-power objective, as the poles were magnetized and demagnetized by the making and breaking of the 120-volt current in the huge coils. The magnet had absolutely no effect on the delicate ciliary movement which kept on continuously, nor did it cause the slightest change or vibration in the cells themselves, suspended in the saline solution. After the magnetic observation, a mild continuous electric current of one to two milliampères C.S. was carried through the microscopic field containing the moving ciliated cells, and this also had no effect whatever upon the movement.

Another frog was now taken and curarized, fastened upon a pasteboard frog-plate, and the web of the foot stretched in the usual manner to show the circulation of the blood in the capillaries under high power. As before, the object to be observed was placed between the poles of our magnet and the microscope focussed upon it. The poles had to be separated somewhat farther to admit the large foot of the frog. With the clearance thus employed to allow of inserting the frog's foot the magnetic intensity was reduced from

[1] C.G.S., or "centimetre-gramme-second," is the unit of measurement. The earth's magnetic field, measured horizontally, for instance, is estimated to be 0.18 C.G.S. lines per sq. cm. near New York, consequently our magnetic field was 27.778 times that of the earth's horizontal component, that aligns the compass needle.

5,000 C. G. S. lines per square centimetre to 1,500 C. G. S. lines per sq. cm. Repeated observation by both of us failed to demonstrate the feeblest influence of the magnet upon the blood-cells or their movement in the vessels. At this point we determined to note the effect of the continuous current upon the circulation. A fine copper wire was placed upon one toe, and another wrapped in moistened filtering paper above the ankle. The current strength in these trials never exceeded two ma., and generally varied between one and two milliampères.

Whenever the current was made the circulation in the foot under the microscope, which was about midway between the two electrodes (three centimetres apart) gradually grew sluggish and finally ceased, complete stasis being produced, the blood-vessels dilating. As soon as the current was cut off, gradually movement made itself felt in the stagnant capillaries, and becoming more and more lively, the circulation was in a few moments restored to its normal state. The effect was not due to the magnet, however, for it was observed with the current in the coils made or broken. This experiment was gone over frequently by each of us, so that the facts were fully verified.

It was now resolved to put Benedikt's statement to proof that magnetism "increases the resistance to conduction in motor nerves," thus causing paralysis. For this purpose a set of idle field magnets (Fig. 2) which converge into a cylinder two feet in diameter and seven inches deep was employed. In this cylinder a small and lively young dog was placed and kept for five hours, and subjected during all that time to the influence of a magnetic field whose intensity was from 1,000 to 2,000 C. G. S. lines to the square centimetre. Fig. 2 is taken with a boy inside of the cavity in which the dog was kept for five hours. The magnets were excited while the photograph was being taken with the boy in it, as is evidenced by the position of the bolt above, and by the bar of iron AB, which not only supports its own weight in this horizontal position when touching the pole-piece, but also supports the wrench at its outer extremity. The chain, too, is magnetically influenced. There was no effect upon the boy. A clearer idea of the power of this magnet may be obtained when I say that heavy bolts, chisels, and pieces of iron in the immediate neighborhood of this cylinder were drawn to it irresistibly and that it required considerable muscular effort to remove them. A heavy bolt placed slightly above the centre or axis of the cylinder remained for a moment suspended in the air, like Mahomet's coffin, so powerful was the opposing magnetic force upon it compared with gravitation.

The five hours' exposure to this influence had not the slightest visible effect upon the animal, which was rather livelier in his capers on being set free than before, owing to his joy at being liberated from the cage.

Our next experiments were directed to studying the influence of magnetic fields on the human brain. The type of dynamo employed for this purpose will be seen in the illustration (Fig. 3). The machine converts about seventy H. P. at full load. The armature and one journal were removed, leaving the space between the pole-pieces free. This will be best understood by reference to the figures. Fig. 4 gives a view of the pole-pieces into the cavity between which the head was to be inserted. This cavity is 35 cm. (14 inches) in diameter and 60 cm. deep. The weight of this electro-magnet is over 5,000 lbs., and the intensity of the magnetic field produced within the polar cavity after removal of the armature, though not uniform, may be estimated at a mean of 2,500 C. G. S. lines per sq. cm. A long board was placed upon the base plate leading into this polar cavity, and the subject experimented upon lay on his back upon the board, with his head and shoulders in the cavity between the poles, and exposed thus to the full influence of the magnetic field. There would be comparatively feeble residual magnetism with no current in the coils. A switch so nearly silent in action as to be inaudible to the subject was arranged to close and open the exciting current circuit through the field coils. On closing the switch, nearly the full magnetic intensity would be active and permeating the head within practically one second (theoretically it takes an indefinitely long time to establish the full current and magnetism.) Similarly, on opening the switch, almost the whole intensity would disappear in about one second.

Five men (ourselves among the number) were subjected to trial. One case described will describe all.

The subject lay back upon the board and concentrated his attention upon his sensations. His right wrist was extended and was grasped by one observer, who took sphygmographic tracings of the pulse. A second observer placed a hand on his chest to observe any irregularity that might occur in respiration. A third observer in view of these two, but unseen by the subject of the experiment, opened and closed the switch that excited and relaxed the field, signalling to the first two observers as he did so. The strong magnetic influence was, therefore, turned on or off at will and without the knowledge of the subject. Several sphygmographic tracings were taken in each of the four subjects, and in one the knee-jerk was tested continuously.

The sphygmographic tracings taken continuously during the séance show no change in regularity, in spite of the making and breaking of the enormous magnetic influence during its registration. The respiration was not influenced in the least. The knee-jerk also presented absolutely no change. As to common sensations, there were none that could be attributed to the magnetic influence, and the subject could not discover when or whether the field had been excited. The testimony of all five subjects was alike. In one experiment the subject held a steel screw in his mouth and was then able to tell when the poles were magnetized or demagnetized, but only by the pulling of the screw to one side or another, not by any peculiar sensation or taste.

Our last series of experiments was in connection with reversed magnetism.

A large coil of stout cotton-covered copper wire, about 30 cm. high and 25 cm. internal diameter, composed of nearly 2,000 turns, and weighing about 70 kilos, was supported horizontally in such a manner that the head of the subject experimented upon could be freely introduced within the coil and subjected to the electro-magnetic field created there by passing a current through the wire. The resistance of the coil was 10 ohms, and its inductance 0.73 henry. An alternating electro-motive force of 1,200 volts, making 140 cycles or 280 alternations per second, was connected with this coil, the current supplied being 1.85 ampères. The magnetic field in the coil would thus be reversed 280 times per second. Each of the authors acted as subjects in the experiment, permitting the 1,200 volt alternating current to be made and broken frequently in the huge magnetic coil surrounding his head. No effect whatever was experienced. The coil itself hummed with the current, and a strip of sheet iron held in the cavity of the coil, but not touching it, vibrated perceptibly in the hand and gave a distinct loud sound, which was determined to be middle C of the musical scale by means of Helmholtz resonators.

(*To be continued.*)

AN order has been issued by the German government that the Centigrade thermometer be exclusively used throughout the empire from the 1st of January next, instead of the Réaumur thermometer as heretofore.

THE
Journal of the American Medical Association
PUBLISHED WEEKLY.

SUBSCRIPTION PRICE, INCLUDING POSTAGE:
PER ANNUM, IN ADVANCE $5.00
SINGLE COPIES. . . . . 10 CENTS.

Subscriptions may begin at any time and be sent to
THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION,
No. 68 WABASH AVE., CHICAGO, ILLINOIS.

All members of the Association should send their Annual Dues to the Treasurer, RICHARD J. DUNGLISON, M.D., Lock Box 1274, Philadelphia, Pa.

MEMBERSHIP IN THE AMERICAN MEDICAL ASSOCIATION.

This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Richard J. Dunglison, Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own Society, signed by the President and Secretary of said Society, with five dollars for annual dues and subscription for THE JOURNAL. Attendance as a delegate at an annual meeting of the Association is not necessary to obtain membership. On receipt of the above amount the weekly JOURNAL of the Association will be forwarded regularly.

SATURDAY, MARCH 25, 1893.

THE ETIOLOGY OF CARCINOMA.

It is a very difficut task to give a résumé of the questions relating to the parasitic theory of carcinoma in the limits of an ordinary journal article. This is the case on account of the large amount of literature which has accumulated on the subject in a very short time—a literature to which each week brings important additions. Then too, the number of contending theories of the etiology of cancer, and the diversity of opinion among the various contributors, make it a difficult task to do them all justice. To be an impartial summary, however, a résumé must give a fair statement of each of the several views entertained by the different authorities. It must not be a one-sided statement of the case, no matter what may be the individual bias of the reviewer.

At the eighty-seventh annual meeting of the Medical Society of the State of New York, DR. ROSWELL PARK read a paper on "The Parasitic Theory of the Etiology of Carcinoma" (*New York Medical Journal*, March 4, 1893). In this paper the author saw fit to digress to the extent of severely criticising a statement made by the writer of an editorial on the etiology of carcinoma, in this JOURNAL of Feb. 3, 1893. In his criticism of this very loose statement, DR. PARK is justified; though it is difficult for us to see the exact necessity for the digression. For the justification of the author of that careless statement, however, let it be said that, by "inferior animals," he meant the "lower animals," as distinguished from the "higher animals," in the generally accepted sense. It is scarcely plausible that this writer could have fallen into the error of including among "inferior animals," all of those below man; for, with the volumes of the Transactions of the London Pathological Society before his eyes as he wrote the editorial, he certainly could not have overlooked the various reports of cases of carcinoma in the dog, cat, monkey, and other "higher animals." So, in justice to this writer, let us criticise him for an inaccurate statement, rather than for a "lamentable lack of knowledge."

Since the distinguished author of the address above noted has seen fit to criticise, he will, no doubt, assent to a critical analysis of certain features of his own contribution. As stated above, we realize the difficulties in making a fair review of the question under discussion. But DR. PARK seems to be decidedly biased toward the protozoan theory of the etiology of cancer, and he has not given a just statement of the work of those authorities who array themselves against the cancer parasite, as at present identified. A paper in which five pages are devoted to the work of the authorities who favor the parasitic theory of carcinoma, and in which the opposing views are condensed in a half column, cannot be considered a liberal summary; for, up to the present time, not an observation has been made on the cancer parasite but that it has been offset by a counter contribution, and, in each case, by men of equal reputation as investigators.

DR. PARK refers to the time honored work of VIRCHOW on certain carcinoma cell inclusions, and in this connection makes the statement that, "their true nature was not made out till 1888, *when they were identified as belonging to the sporozoa* (italics ours) although he himself (VIRCHOW) later suggested the possibility of their being psorosperms." This is an astonishing piece of information! and one, we believe, which would surprise the great VIRCHOW, himself. If these bodies so long since accurately described are *sporozoa*, then indeed, there can be but one view to take of the cancer parasite question—and that is the one-sided view of DR. PARK. But many pathologists of note will dissent from this statement. In fact, even in one of his latest utterances on this point, VIRCHOW (*Virchow's Archiv.*, Bd. 127, Heft 1, p. 188) says, with reference to the psorospermic nature of the inclusions described by him in carcinoma and molluscum contagiosum, that he must still adhere to the attitude which he assumed in 1865, *when he could not convince himself of the parasitic origin of these objects.* In his original paper, VIRCHOW described very accurately the development of the cancer cell inclusions, which have presented themselves to the view of every careful observer, and he considered them the result of an endogenous cell formation. The larger inclusions were regarded as hypertrophied nuclei which had become the seat of vacuoles, and whose nucleoli had become homogenous. The limiting membrane surrounding the altered cell and nuclear contents, was the original cell membrane. Such were the views of VIRCHOW thus early expressed, and, in the opinion of many

careful investigators, these observations are as true to-day as they were when first made. As NOEGGERATH (*Beiträge zur Struktur und Entwickelung des Carcinoms*, Wiesbaden, 1892) justly says, had not this classical description of VIRCHOW fallen into oblivion, much needless confusion on the subject of the carcinoma organism might have been avoided.

Our author gives the conclusions of WICKHAM, and refers to the work of the French investigators in the same line, without a mention of the investigators who have effectually disproved all of this work. As a matter of fact, the opinions of WICKHAM and his confrères have been so vigorously attacked by KIENER, STEINHAUS, RIBBERT, NOEGGERATH, and others, that the question of the parasitic nature of the larger cell inclusions should be forever laid aside. It has only remained for NOEGGERATH (*loc. cit.*) to put the quietus to this discussion, which he has done by directing attention to the error of WICKHAM and others, in disregarding the original invagination of one epithelial cell by its neighbor as the starting point of the inclusions. By his beautiful micro-technical studies NOEGGERATH has followed every stage in the development of the so-called "parasites," and no impartial student can doubt the correctness of his conclusions.

We are greatly surprised to note that the communication of JACKSON CLARK before the London Pathological Society (*British Medical Journal*, Dec. 24, 1892, p. 1387), is considered by DR. PARK at considerable length. That such an erratic and unscientific contribution as CLARK'S should be entertained for a moment, is most unfortunate. Will any one read the five steps in the development of CLARK'S psorosperms (so carefully quoted by our reviewer), and then tell us the life history of these organisms is still unknown? Here is a statement taken from this same communication!—"The large cells (of epitheliomata) at a certain period showed an extension of the nuclear net-work which spread outwards, generally as a delicate but sometimes as a coarse reticulum which filled the whole cell, and this *now split up into innumerable delicate amœbæ, which at first were devoid of a nucleus*." (italics ours).

In a subsequent paper CLARK (*British Medical Journal*, Jan. 21, 1893, p. 115) describes psorosperms in a case of sarcoma, and here states that these organisms not only *caused* squamous epitheliomata, but also cancers of the most varied kinds, and some adenomata and cysts of the breast. He found, in some hundreds of sections of many cancers, parasites in every field of the highest powers of the microscope! Again, in another report, this same author (*British Medical Journal*, Jan. 21, 1893, p. 119) is responsible for the statement that, "more than two-thirds of the weight of a round-celled sarcoma of the testicle was accounted for by the psorosperms present." Is it any wonder that this work of CLARK has been criticised by all of his own associates? Every student who has given this subject the least attention will agree with RUFFER, (*British Medical Journal*, Feb. 4, 1893) who, in a letter, says, "There are so many other statements in MR. CLARK'S paper which call for comment, and which are of so extraordinary a nature that one may well doubt whether they were made in sober earnest." And still the work of CLARK has received more attention at the hands of DR. PARK, than all the evidence contrary to the parasitic theory of cancer.

The "elaborate contribution" of PODWYSSOZKI and SAWTSCHENKO has not been so complacently received, as one is led to infer from the review under consideration. Not only FOÀ, but a number of other investigators have attacked this work from various attitudes, with the effect of greatly diminishing its importance. If anything more were needed to throw distrust on this contribution, the subsequent publication of SAWTSCHENKO (*Cent. f. Bakteriologie*, XII Band, No. 1, 1892), would effect the purpose; for, in this place, SAWTSCHENKO describes and figures an entirely different set of "parasites," the while endeavoring to reconcile these appearances with those described in the conjoined contribution. If we must regard all of the objects described by these two authors as sporozoa, we can accept the startling assertions of CLARK with better grace.

The careful scientific investigations of SOUDAKEWITSCH, FOÀ, and RUFFER and WALKER, receive scant mention in DR. PARK'S paper. After having carefully followed the work on this subject for two years, not only in the literature, but also in the laboratory, we are inclined to look upon the last three contributions as the most important additions to our knowledge of the carcinoma organism. These three papers are mentioned in common, because the authors describe the same bodies as sporzoa, quite independently of each other. They all employed precise micro-technical methods, and entirely disregard the larger inclusions of the French school. They could not calculate their sporzoa *by weight*, as CLARK has done, nor did they find them in every tumor examined. On the contrary, they found their "parasites" only sparingly present, and only in certain specimens of cancer. FOÀ, for instance, examined more than seventy cancers, and found objects which he could regard as parasites with certainty only in four cases. RUFFER and WALKER tell us of examining hundreds of sections before finding the characteristic objects. But even this work, with all its evidences of accuracy, cannot be accepted without a challenge. For instance, MULLER (*Virchow's Archiv.* Bd. 130, Heft 3, 1892), in a careful study of the cellular processes in tumors, directs attention to the process of indirect fragmentation of the nucleus, followed by endogenous cell formation, in dropsical car-

cinoma cells ("physaliden"). MULLER claims to have observed, in these studies, cell inclusions which corresponded in every way to RUFFER and WALKER's parasites, and he maintains that the "sporzoa" of these authors are only the products of an irregular division process in an altered epithelial cell. Since this criticism applies to the work of RUFFER and WALKER, it must also include many of the "parasites" of SOUDAKEWITSCH, and of FOÀ, since these investigators have, in part at least, described the same objects. The author is evidently not patriotically inclined, for we notice that he mentions the work of but one American investigator. Perhaps this is because the gentlemen on this side of the water who have studied this question have not embraced the evidence favoring the sporozoan parasite of carcinoma with sufficient enthusiasm. Nevertheless, the work of WELSH, MACALLUM, FLEXNER, and others, has been of a character which the recent conservative opinions of a number of prominent foreign investigators corroborated, and their work should be credited in a résumé of this subject.

Much more evidence of a character contrary to the enticing protozoan theory of the etiology of carcinoma as at present supported, might be adduced, but we believe enough has been said to correct the erroneous impression left after a reading of DR. PARK's paper.

ARTIFICIAL RIPENING OF IMMATURE CATARACTS.

It has long been one of the tenets of ophthalmology that no senile cataract should be extracted until it is ripe; that is, until the degenerative process that begins either in the nucleus or the cortex of the lens, or in both together, has extended to its whole substance, thus loosening it from the capsule, and allowing its easy and complete extrusion when the capsule is divided.

To follow this rule entails upon many subjects of cataract an enforced period of disability from the time the opacity reaches a degree sufficient to incapacitate them for work, to the time when the lens is fit to be operated upon.

Inasmuch as this period of growth from incipiency to full maturity is from one to three years or more, the delay, to many, is a serious matter, and especially so if the subject is a person upon whose labors others as well as himself are dependent.

Any method, therefore, of operation or treatment, that has for its object the shortening of this period, is deserving of careful consideration.

Of late, some operators, among them SCHWEIGER, maintain that the lens may be extracted safely after the sixtieth year, even if it is in part unclouded. Others again operate on immature cataracts that show a decided slowness in ripening, and resort to a subsequent needling operation to clear the pupil of any cortical material that may remain.

The results of such operations are, however, rather uncertain. The tenacious cortical substance that is left in the anterior chamber forms an excellent nidus for the development of any infective germs that unnoticed may have slipped past the surgeon's guard; or it may swell rapidly and induce an iritis, and particles of it may so clog the wound as to prevent rapid and complete union. To prevent these complications MCKEOWN, WICKERCIEWICZ, PANAS, DE WECKER and others, practice washing out the tenacious cortical matter from the anterior chamber with sterilized water or some non-irritating antiseptic solution, using a small suitably constructed syringe for the purpose, and claim that by this means many immature cataracts can be safely and successfully removed. However, in the hands of many, this practice has seemed to result so disastrously that it has not, as yet, received many adherents.

FÖRSTER was the first to make use of a procedure for artificially ripening the immature cataract, aside from the operation of a preliminary iridectomy, which had previously been known to have some influence in bringing about a more rapid development of a cataract.

His method consists in rubbing the cornea against the lens with a small blunt instrument, such as a DAVID's scoop, after first making an iridectomy. As a result of this manipulation, although the capsule is not supposed to be ruptured, the lens fibres undergo a rapid degeneration, and in the course of from one to three weeks the lens becomes completely opaque and in a suitable condition for removal.

It is essential that the cornea be not rubbed too violently, and that the iris be not injured between the cornea and the lens. No little experience is required to determine the exact amount of force to be used in the trituration of the lens according to FÖRSTER's method. If too little is done nothing is accomplished, while if the manipulation is too vigorous, either the capsule is ruptured or the suspensory ligament is injured, so that at the time of the extraction the operation will be complicated by an escape of vitreous.

MCHARDY says "that he has noticed in extracting cataracts that he has artificially ripened by trituration of the cortex, that there had been a far greater percentage of cases with protrusion of vitreous humor than he has been familiar with when dealing with cataracts that have not been artificially ripened."

Others who have used this method, testify to the difficulty of correctly estimating the amount of force that can safely be used, and to the danger of exciting inflammation of the iris.

To avoid this, BETTMANN, in 1885, practiced intraocular massage of the lens, which he calls "direct trituration."

In this operation an iridectomy is first done, although this may be dispensed with, after which there is introduced into the anterior chamber, through the corneal wound, a small spatula, with which the surface of the lens is gently rubbed. The result is apparent in a few days as an increased opacity, and in the course of a few weeks at the farthest, the cataract is usually ready for extraction. This method has distinct advantages over that of FÖRSTER, in that it is more accurate, is not so likely to wound the iris, and is more certain in its action.

The application being made directly to the lens, one can more accurately gauge the force that is used, and there is, in consequence, less danger of rupturing the suspensory ligament.

Of the twenty cases thus far reported by BETTMANN, there was, in the subsequent operation of extraction, an escape of vitreous in only two. In five of his cases, the trituration was done without a preliminary iridectomy, with results as favorable as when a piece of the iris was removed.

He found that the soft cortical cataracts mature more rapidly than those having a hard sclerosed nucleus, while cataracts secondary to myopia or other intra-ocular affections are not considered amenable to this form of treatment.

This method is certainly deserving of an extensive trial in order to determine its complete value.

A NEW AND RAPID METHOD OF REMOVING THE UTERUS.—At a recent meeting of the Kansas City Academy of Medicine, Dr. Emory Lanphear presented a number of fibroid tumors, sarcomata, etc., removed by a new method of abdominal hysterectomy. The abdomen and vagina having been carefully sterilized, he makes an incision in the median line terminating as close to the pubes as possible, draws the uterus with one tube and ovary to one side and applies a clamp to the broad ligament; a strong ligature is passed a half inch from this, including the blood vessels, and tied; the intervening tissue is then cut with scissors. Upon the opposite side the same procedure is carried out. When done, the uterus (hitherto held down by the broad ligament) can be lifted up into the wound and separation from bladder and rectum easily accomplished; these incisions, before and behind, are carried into the vagina, when a Kelly's or Polk's clamp is introduced through the vagina as close as possible to the uterus, its points reaching the ligature already tied in the broad ligament. As soon as properly applied it is closed, and its fellow clamp inserted upon the other side, when the uterus is quickly cut away with curved scissors. The pelvis is irrigated, and the abdominal wound closed and drainage made through the vagina as in cases of vaginal hysterectomy. The clamps are removed in forty-eight hours. The operation can be made in twenty-five to thirty minutes, being much easier than even a vaginal hysterectomy with clamps. By the rapidity allowed and by the good drainage secured, Dr. Lanphear thinks this operation can be done almost as safely as an ovariotomy—certainly as safely as a vaginal hysterectomy; and it is much preferable to any method which leaves a pedicle or stump behind. He finds it is not necessary to unite the bladder to the rectum as union takes place just as quickly without sutures as with them.

ASSOCIATION NEWS.

AMERICAN MEDICAL ASSOCIATION.

The forty-fourth annual session will be held in Milwaukee, Wis., on Tuesday, Wednesday, Thursday, and Friday, June 6, 7, 8, and 9, commencing on Tuesday, at 11 A.M.

"The delegates shall recieve their appointment from permanently organized State Medical Societies, and such County and District Medical Societies as are recognized in their respective State societies, and from the medical department of the Army and Navy, and the marine-hospital service of the United States.

"Each State, County, and District Medical Society entitled to representation shall have the privilege of sending to the Association one delegate for every ten of its regular resident members, and one for every additional fraction of more than half that number: *Provided*, however, that the number of delegates for any particular State, territory, county, city, or town shall not exceed the ratio of one in ten of the resident physicians who may have signed the Code of the Asscciation."

Members by application.—Members by application shall consist of such members of the State, County, and District Medical Societies entitled to representation in this Association as shall make application in writing to the Treasurer, and accompany said application with a certificate of good standing, signed by the President and Secretary of the Society of which they are members, and the amount of the annual membership fee, five dollars. They shall have their names upon the roll, and have all the rights and privileges accorded to permanent members, and shall retain their membership upon the same terms.

The following resolution was adopted at the Session of 1888:—

That in future, each delegate or permanent member shall, when he registers, also record the name of the Section, if any, that he will attend, and in which he will cast his vote for Section officers.

Secretaries of Medical Societies, as above designated, are earnestly requested to forward, at once, lists of their delegates.

Also, that the permanent Secretary may be enabled to erase from the roll the names of those who have forfeited their membership, the Secretaries are, by special resolution, requested to send him, annually, a corrected list of the membership of their respective societies.

AMENDMENTS TO THE CONSTITUTION AND BY-LAWS.

Offered by Dr. C. A. L. Reed: Amend Article II, Section 1, of the regulations, by inserting after the word United States, the words "The Dominion of Canada, Labrador, and Newfoundland," and that such other changes be made in the phraseology of the Regulations and By-laws as to make the same con-

form to this contemplated enlarged jurisdiction of the Association.

By Dr. I. N. Quimby: "That Thursday morning's general session be omitted, and the time be devoted to Sectional work."

By Drs. John Morris and J. G. Kiernan: Amend Section 7 of the Constitution, entitled, "The General Business Committee," as follows: "It shall be the future duty of the General Business Committee to make and present the nominations for the officers of the Association and its Standing Committees, and recommend the time and place for the meeting of the Association.

"The General Business Committee of the Association shall perform all duties hitherto performed by the Committee on Nominations, which is hereby abolished. All sections of the Constitution and By-laws, or parts thereof inconsistent with the amendment, are hereby repealed."

By Dr. F. F. Dow: Amendment to the Constitution, to be known as Article VIII, entitled "The Code of Ethics:"

"The relations of the physician to the patient, to the public, and to the profession require that he shall be of good moral character, and in his personal and professional conduct without reproach; that he shall avoid pretense and notoriety; that he shall properly qualify himself for professional duty by broad and liberal studies in letters, sciences, and arts; that he shall employ reasonable and reputable methods of practice; that he shall respect the laws of the State; that he shall encourage efficient means for the enlightenment of public opinion regarding the responsibilities of medical men and the relation of medical men and the relation of the citizen to public health, for the cultivation of medical education, for the promotion of the interests, usefulness, and honor of the profession, for the emulation, concerted action, and friendly intercourse among those engaged in it.

"Substituting the Roman numerals IX for VIII.

"All Articles, By-laws, and Codes inconsistent with this amendment are hereby repealed."

By Dr. J. B. Rauch: "That on and after July 1, 1897, no one will be admitted to membership in the American Medical Association who has not studied medicine for four years, and attended four annual courses of lectures of at least six months' duration.

By Dr. F. F. Dow: Amend By-law No. XI, relating to the Judicial Council. The second clause of paragraph three shall be amended to read as follows; "The decisions of said Council on all matters referred to it by the Association shall be reported at the earliest practicable moment, and shall be final unless revised by the Association."

By Dr. A. B. Hosmer: WHEREAS, The constantly increasing number of papers on general surgical subjects presented each year at the Surgical Section of this Association, the reading and even restricted discussion of which prohibit the introduction of any considerable number of papers on strictly orthopædic subjects, which might not prove of universal interest to the general surgeon; and

"WHEREAS, There are already a sufficient and rapidly increasing number of members of the Surgical Section of this Association specially interested in this branch of surgery to warrant it; therefore be it

"*Resolved*, To amend Article II of the By-laws by the addition, under the heading Sections and after 12, Physiology and Dietetics, the following: 13 Orthopædic Surgery."

ADDRESSES.

On General Medicine, by Dr. Hobart A. Hare, Philadelphia, Pa.

On General Surgery, by Dr. Henry H. Mudd, St. Louis, Mo.

On State Medicine, by Dr. Walter Wyman, Washington, D. C.

Committee of Arrangements, Dr. U. O. B. Wingate, 560–564 Jefferson St., Milwaukee, Wis.

WILLIAM B. ATKINSON, M.D,
Permanent Secretary.

Philadelphia, 1400 Pine St., S. W. cor. Broad.

SECTIONS.

"The Chairman of each Section shall prepare an address on the recent advancements in the branches belonging to his Section, including suggestions in regard to improvements in methods of work, and present the same to the Section over which he presides on the first day of its annual meeting. The reading of such address not to occupy more than forty minutes. . . ."—*By-Laws.*

Practice of Medicine.—Dr. Chas. G. Stockton, Chairman, 436 Franklin St., Buffalo, N. Y.; Dr. G. W. Webster, Secretary, 70 State St., Chicago, Ill.

Obstetrics and Diseases of Women.—Dr. J. Milton Duff, Chairman, 2005 Carson St., Pittsburgh, Pa.; Dr. H. B. Ward, Secretary, 209 East Seventh St., Topeka, Kan.

Surgery and Anatomy.—Dr. James T. Jelks, Chairman, Opposite Arlington House, Hot Springs, Ark.; Dr. Liston H. Montgomery, Secretary, 70 State St. Chicago, Ill.

State Medicine.—Dr. Chas. A. Lindsley, Chairman, 15 Elm St., New Haven, Conn.; Dr. S. P. Duffield, Secretary, Municipal Court Building, Detroit, Mich.

Ophthalmology.—Dr. S. D. Risley, Chairman, 1722 Walnut St., Philadelphia, Pa.; Dr. Henry Gradle, Secretary, 65 East Randolph St., Chicago, Ill.

Laryngology and Otology.—Dr. E. L. Shurley, Chairman, 25 Washington Ave., Detroit, Mich.; Dr. J. E. Boylan, Secretary, 113 Broadway, Cincinnati Ohio.

Diseases of Children.—Dr. C. G. Jennings, Chairman, 457 Jefferson Ave., Detroit, Mich.; Dr. Frank S. Parsons, Secretary, Northampton, Mass.

Oral and Dental Surgery.—Dr. A. E. Baldwin, Chairman, 828 West Adams St., Chicago, Ill.; Dr. E. S. Talbot, Secretary, 125 State St., Chicago, Ill.

Neurology and Medical Jurisprudence.—Dr. Charles K. Mills, Chairman, 1907 Chestnut St., Philadelphia, Pa.; Dr. J. G. Kiernan, Secretary, 834 Opera House Block, Chicago, Ill.

Dermatology and Syphilography.—Dr. Louis A. Duhring, Chairman, 1411 Spruce St., Philadelphia, Pa.; Dr. W. H. Dunlap, Secretary, 408 Fayette St., Syracuse, N. Y.

Materia Medica and Pharmacy.—Dr. Frank Woodbury, Chairman, 218 South Sixteenth St., Philadelphia, Pa.; Dr. F. E. Stewart, Secretary, Glen Springs Sanitarium, Watkins, N. Y.

Physiology and Dietetics.—Dr. C. H. A. Kleinschmidt, Chairman, 3045 N St., N. W., Washington, D. C.; Dr. Ephraim Cutter, Secretary, 120 Broadway, New York, N. Y.

"A member desiring to read a paper before a Section should forward the paper, or its *title* and *length*

(not to exceed twenty minutes in reading), to the Chairman of the appropriate Section at least one month before the meeting."—*By-Laws.*

OPHTHALMIC SECTION.

The time for the annual meeting of the American Medical Association (June 6 to 9, at Milwaukee, Wis.) is so near at hand that all members who wish to contribute papers must send the title of their paper to the Secretary before April 25, in order to have them appear in the general programme, and in order to make arrangements for discussion. It is also urgently requested that brief abstracts be furnished not later than May 15 in the form in which authors wish them to appear in the preliminary report of the meeting. The announced communications, as well as the names of those who have promised to attend, assure the success of the next meeting. In view of the historical interest which the Columbian celebration lends to the meeting, it is highly desirable that American Ophthalmology should be well represented by the names and presence of those who have contributed to its present advanced position.

S. D. RISLEY, M.D., Chairman,
1722 Walnut St., Philadelphia.

H. GRADLE, M.D., Secretary,
65 Randolph St., Chicago.

DOMESTIC CORRESPONDENCE.

To the Editor of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION:

Sir:—Belonging to those who are opposed to any revision of the Code, I send you the following remarks addressed to the Chicago Practitioner's Club at a recent meeting when this matter was discussed:

In this country, where liberty is confounded with unbridled license, where justice is so often an article of merchandise, where statesmanship is supplanted by political trickery, where science is used as a cloak to cover ignorance, where, in short, quackery, humbuggery and criminality flourish like vegetation in the tropics, in such a land there is need for a standard around which honorable men gather and by the strength of union elevate their calling to a higher plane, for their own personal good and for the benefit of the generation to follow. For this reason, gentlemen, I am a firm believer first, last and all the time in that grand guidon of the medical profession, the Code of Ethics of the American Medical Association; a document as clear and concise, as comprehensive and adequate as the Declaration of Independence or the Constitution of the United States. Read it as often as you can—the oftener the better—paragraph after paragraph, page after page, and you will be better men, better physicians, better able to cope with the problems and difficulties that daily beset you in your chosen calling.

Simple in its precepts, just in its teachings, correct in its doctrines, and grand in its conception; I would it were required that every candidate for the degree of Doctor of Medicine commit this Code to memory in lieu of presenting a graduating thesis, a custom as absurd as it is useless.

Antagonism is the price of existence, and the nearer you approach the ideal the more bitter the opposition. Hence, it is not surprising that of late years there has been a determined fight against the Code by a class of men who, at least in their own opinion, rank high above the common herd, as they are pleased to call us. According to these distinguished gentlemen, our Code is useless, old fashioned rubbish, which cannot be swept away any too soon, as gentlemen require no code to govern their conduct. Carry this line of argument a little further and to be consistent you will have to abolish every code, whether it be that of morality, religion or law, and allow each individual to decide for himself what is right and what is wrong.

However, do not for one moment delude yourselves into thinking that these medical anarchists do not believe in any code. They are the most fanatical worshipers of their chosen code—the code of the almighty dollar. They would sell their birthrights for a mess of pottage and prostitute their professional honor for a paltry fee. Upon the prospect of a consultation fee you will find them ever willing to meet homeopaths, eclectrics, abortionists and quacks of all decriptions in consultation. In consultations with physicians, you will find them always ready to agree with you in the consulting room, but to the family, express in a gentle and tender manner their misgivings of your management of the case, and perchance in a little while you may find them in charge of the patient, particularly if you are a young physicisn without influence or friends. No opportunity is missed by them to see their names in the daily prints, always anxious to be interviewed on any subject, the source of considerable revenue to many an impecunious newspaper reporter. You may look for their names in testimonials endorsing anything under the sun, from salad dressings to Ypsilante underwear, anything, everything, provided only the testimonial be given wide circulation, especially in the daily press, with all the titles in full.

These gentlemen have a profound contempt for the Code of Ethics—they want none of it, and with good reason—no criminal ever admired the law that hung him.

Gentlemen, the calling of a physician is an arduous one at best, trials and tribulations abound on every side—joys and pleasures are few and far between—but is the power of each and every one of us by following our guidon, the Code of Ethics, and maintaining its principles to the end, to have the happy consciousness of a life well spent? I know of no greater eulogy to the departed physician, than is comprised in these few words: "He lived up to the Code."

DR. E. J. DOERING.

BOOK REVIEWS.

THE ANATOMY AND SURGICAL TREATMENT OF HERNIA. By HENRY O. MARCY, A.M., M.D., LL.D., of Boston. President of the American Medical Association, etc. With sixty-six full page lithographs and litographic plates, including eight colored plates from Bougery, and thirty-seven illustrations in the text. New York. D. Appleton & Company, 1892.

The members of the American Medical Association who were fortunate enough to be present at the last meeting will remember with what pleasure they were entertained by Dr. Marcy in listening to his lecture on hernia, and which was so well illustrated by large illuminated plates shown on canvass. They now have an opportunity of possessing a copy of Dr. Marcy's great work on this subject, the like of which we can truly say has not before been placed within the reach of American practitioners of surgery.

In opening this portly tome, after the title page the first thing that strikes our attention is the author's dedication and beautiful tribute to Sir Joseph Lister. Following this are his enconiums of Sir Astley Cooper, whose work in this

line is of itself sufficient to cause his name to be written among the numerous. With discriminating justice we find the author giving full and due credit to all of the great masters who have enriched our literature by a record of their work in this relation.

In a realization that modern surgical methods were adapted to an improved treatment of hernia we find the author's concept of the present volume.

Chapter I is devoted to a definition and classification of hernia, its frequency as to age, sex, occupation, and illustration tables, other chapters taking up the anatomy of the parts involved, the causes and conditions, including the importance of diagnostic differentiation of the several varieties in order to intelligent treatment. After which we find given a description of instrumental supports, and conditions demanding operative interference. The details of various surgical procedures are given with great clearness.

The reader will find complete chapters on every seemingly possible variety of hernia, in which are found beautifully illustrated the anatomical conditions that may be anticipated, with the most approved method of treatment.

Concluding the work of twenty-seven chapters, with a masterly dissertation on the operative measures advised for the cure of hernia, and the advantages of the buried tendon suture, in which he shows it is possible to reconstruct the obliquity of the inguinal canal, and giving a comparison of the different methods to be adopted for this purpose, including those recommended by Schide, Macewen, Bassini and the author. Statistics are given to show the safety of operations and resultant cures.

The mechanical work of the publishers is a superb illustration of the best in the art of bookmaking.

Diseases of the Eye. A Hand-book of Ophthalmic Practice for Students and Practitioners. By G. E. De Schweinitz, M.D., Professor of Diseases of the Eye in the Philadelphia Policlinic, etc. 8vo., pp. 641. Two hundred and sixteen illustrations and two chromo-lithographic plates. Philadelphia: W. B. Saunders.

The work of Dr. De Schweinitz is an able presentation, in clear and concise form, of the principles of ophthalmology, with especial emphasis laid upon the practical parts of the subject. The systematic directions for examining cases, the judicious classificatition of the various diseases, the tabular grouping of symptoms, the excellent discussion of the indications for operation, the explicit directions for the preparation of the patient, the instruments, etc., and the careful description of the operation itself, all go to make up an excellent hand-book of practice.

The author has been assisted by Dr. James Wallace, of Philadelphia, who contributes the chapter on general optical principles, including accommodation and convergence; the chapter on normal and abnormal refraction; the section treating of the theory and practice of the ophthalmoscope, as well as that portion of the work that relates to the mechanism of diplopia, the rotation of the eyeball and the causes of convergent and divergent squint. This is certainly very clearly presented, and will enable the student to obtain a better grasp of this intricate part of the subject.

Retinoscopy, one of the most valuable objective aids to a determination of errors of refraction, is treated of by Dr. Edward Jackson, Professor of Ophthalmology in the Philadelphia Policlinic. The principle of this test is very clearly explained; but we regret that the author has confined the description of the technique, so far as it applies to the determination of the exact degree of an error, to his own individual method, which in the experience of many has not been found the most practicable.

The method of placing suitable glasses in the trial frame until the point of turning of the shadow is reached has, we surmise, gained a much larger acceptance than the excellent method of Dr. Jackson, and is, in our opinion, easier of application.

The book is excellently printed, and the numerous illustrations are well selected and well executed.

We can heartily recommend this work, and predict that it will make many friends among students and practitioners, as well as among those especially interested in ophthalmic science and practice.

Handbook of Materia Medica, Pharmacy and Therapeutics, including the Physiological Action of Drugs, the special Therapeutics of Disease, Official and Practical Pharmacy, and Minute Directions for Prescription Writing. By Samuel O. L. Potter, A.M., M.D., M.R.C.P., Lond., Professor of the Theory and Practice of Medicine in the Cooper Medical College of San Francisco, etc. Fourth edition, revised. Philadelphia: P. Blakiston, Son & Co. 1893. $4.00.

Out of the far West, from the Golden Gate, comes a literary treasure. The first impression of this book, a wholesome and pleasing impression, is gained from the gracefully worded inscription. It does not often happen that a scientific writer caps the climax of his labors by dedicating a book to his devoted wife. We construe this happy act as an index of the sterling worth of his character. He is not too timorous to stand proudly forth as a conspicuous and complete answer to that widely discussed question which has agitated society and filled a large place in general literature of late: "Is marriage a failure?" One naturally enters upon the study of his book with such a sentiment of sympathetic admiration of the writer as imparts an enthusiasm for his work. Long life to them both!

The honesty of the author is manifest on every hand, and his style is fresh and interesting. He presents as concisely as possible the essentials of practical materia medica and therapeutics, with the subjects arranged on a modified alphabetical plan that allows of the grouping together of agents closely related physiologically and therapeutically.

There is a section on pharmacy, an acquaintance with which will enable practitioners to be less dependent on the counter-prescribing, receipt-renewing, doctor-discrediting druggists, and to retain for their own benefit the legitimate results of their skill by dispensing their own remedies.

The article on prescription writing is a thoroughly admirable one. No doctor should essay to write prescriptions to be seen by any one beside himself, without such instructions as are given here. It is almost enough to make one beside himself to see the so-called prescriptions of many a doctor who is ignorant in this art. Such physicians are sensibly "advised to write their prescriptions wholly in English if they cannot write them in decent Latin."

There is a 10-page list of Latin words, including the most common prescription verbs, participles, prepositions, and the nominative and genitive case endings of the different declensions. A comparative table of dangerous abbreviations is also given.

The author has taken great pains to give the derivation of terms, and a scholarly atmosphere pervades the whole book. In the part on special therapeutics the alphabetical arrangement is continued, and the remedies are printed in full-face type to aid the eye in scanning the text. The initials of the authorities on the various drugs are generally given, and many approved prescriptions are added.

Four pages are filled with the formulæ of the most noted patent medicines and secret nostrums, such as the Keeley cure, Ayer's, Ely's, Hamlin's, Helmbold's, Hostetter's, Davis', Pierce's, Radway's, Swift's S. S., Warner's and other so-called cures.

There are articles on poisoning, differential diagnosis, temperature, obstetrics, urinalysis, etc., a voluminous index

of thirty-eight pages and a convenient thumb index.

However perfect the book, some imperfections may be predicated of it. Curiously enough, on page 507, in a formula, occurs the name of a remedy which cannot be found in the index or anywhere else in the book. The term given is "curacoæ." The student will find no description or mention of it even in the article on aloes in the body of the work. Eggs and rare beef are recommended in chronic Bright's disease, but the author may, or may not, endorse such a diet. On page 179 the statement is made that the active principle of cimicifuga has not been isolated. Cimicifugin, in pill form, is to be had in the market, and is active enough to produce the characteristic effects of the drug.

There is no article on peroxide (dioxide) of hydrogen. No account is given of the following remedies: dermatol, europhen, phenocoll, pyoktanin, salophen, thiol, pental, the salts of strontium or sozoiodol, which was first made and used by one of the author's own townsmen in San Francisco.

MISCELLANY.

PRELIMINARY MANIFESTO OF THE SECTION ON DISEASES OF THE MIND AND NERVOUS SYSTEM, PAN-AMERICAN MEDICAL CONGRESS.—*Honorary Presidents.*—Dr. Jorge Diaz Albertina, Havana, Cuba: Dr. Juan C. Castillo, Lima, Peru; Dr. C. G. Comogys, Cincinnati; Dr. F. X. Dercum, Boston; Dr. J. T. Eskridge, Denver, Col.; Dr. Orpheus Everts, College Hill, Ohio; Dr. Juan N. Covantes, City of Mexico, Mexico; Dr. Allen McLane Hamilton, New York; Dr. William A. Hammond, Washington; Dr. P. O. Hooper, Little Rock, Ark.; Dr. Henry M. Hurd, Baltimore; Dr. J. G. Kiernan, Chicago; Dr. J. A. McBride, Wauwatosa, Wis.; Dr. Charles K. Mills, Philadelphia; Dr. Moncorvo, Rio de Janeiro, U. S. Brazil; Dr. Putnam, Boston; Dr. E. C. Seguin, New York; Dr. E. C. Spitzka, New York; Dr. G. Isaac Urgarte, Santiago, Chile; Dr. Samuel Webber, Boston; Dr. Joseph Workman, Toronto, Canada.

Executive President.—Dr. C. H. Hughes, 500 N. Jefferson avenue, St. Louis, Mo.

Secretaries.—Dr. A. B. Richardson, (English speaking), Columbus, Ohio; Dr. M. G. Echeverria (Spanish speaking), Key West, Fla.; Dr. Meléndezy Cabreñ (Hospicio San Buenaventura), Buenos Ayres, Argentine Republic; Dr. Nicolas Horitz, La Paz, Bolivia; Dr. Cairos Eires, Rio de Janeiro, U. S. of Brazil; Dr. Stephen Lett, Guelph, Canada; Dr. Plaloo, Kingston, Jamaica, W. I.; Dr. Paolo García Medina (carrera 8, núm 277), Bogota, Republic of Colombia; Dr. Emiliano Nuñez (Galiano 19), Havana, Cuba; Dr. Jose Azurdia, Guatemala City, Gautemala; Dr. George Herbert, Wailuku Maui, Hawaii; Dr. Secundino E. Sosa, (Hospital de Mujeres Dementes), City of Mexico, Mexico; Dr. Pellais, Leon, Nicaragua; Dr. Francisco Soca (Florida 90), Móntevideo, Uruguay; Dr. Hemiterio Formez, Merida, Venezuela.

Every effort is being made to make the meetings of the Section on Diseases of Mind and Nervous System both scientifically profitable and pleasant. Papers of distinguished merit from neurolgical students and physicians eminent in psychiatry, have been promised.

Every physician on this continent of America, North or South, is hereby cordially solicited and welcomed to join in the meetings of this important Section of the approaching Pan-American Medical Congress; and it is hoped by unity of effort and cordial coöperation to make the Section of Nervous and Mental Diseases second to none in the Congress in fruitful results to Pan-American psychiatry.

Let us come together from all the America and make the coming convocation one long to be remembered for its scientific and social benefits to all. Fraternally,

C. H. HUGHES,
Executive Pres. Sec. on Diseases of the Mind and Nervous System.

MEMBERS of the Association who desire to present papers at the ensuing meeting on subjects connected with the skin or syphilis, will communicate with Dr, Dunlap, 408 Fayette Park, Syracuse, N. Y., in order that the program may be arranged.

LOUIS A. DUHRING,
Chairman of the Section on Dermatology and Syphilology.

THE Section on Dermatology and Syphilography of the Pan-American Medical Congress has been fully organized as follows:

Honorary Presidents:—Dr. Silva Aranjo, Rio de Janeiro, U. S. of Brazil; Dr. L. Duncan Bulkley, New York; Dr. Juan C. Castillo, Lima, Peru; Dr. Louis A. Duhring, Philadelphia; Dr. Le Grand N. Denslow, St. Paul; Dr. Maximiliano Golan, City of Mexico, Mexico; Dr. James Nevins Hyde, Chicago; Dr. Prince A. Marrow, New York; Dr. R. B. Morison, Baltimore; Dr. D. W. Montgomery, San Francisco; Dr. A. Ravogli, Cincinnati; Dr. A. R. Robinson, Now York; Dr. Antonio Rubio, Pinar del Rio, Cuba; Dr. M. Lucas Sierra, Santiago, Chile; Dr. R. W. Taylor, New York; Dr. A. Van Harlinger, Philadelphia; J. C. White, Boston, Mass; Dr. Edward Wigglesworth, Boston, Mass.

Executive President:—Dr. A. H. Ohmann-Dumesnil, No. 5 South Broadway, St. Louis, Mo.

Secretaries:—Dr. Wm. S. Gottheil (English-speaking), 25 West 53d Street, New York, N.Y.; Dr. John Forest, (Spanish-speaking), Charleston, S. C.; Dr. Carlos Lloveras, (Piedad 944) Buenos Aires, Argentine Republic; Dr. Viscarra Heredia, La Paz, Bolivia; Dr. W. S. Barnes, (Leper Hospital) Mahaica, British Guiana; Dr. Joan P. Gabiza, Rio de Janeiro, U. S. of Brazil; Dr. J. E. Graham, Toronto, Canada; Dr. Enrique Robelin, (Jesus Maria 91) Havana, Cuba; Dr. Daniel E. Coronado, (Calle, 13, núm. 120) Bogota, Republic of Columbia; Dr. Daniel Nunez, San Jose, Costa Rica; Dr. Angel Rivera Paz, Guatemala City, Guatemala; Dr. H. G. McGrew, Honolulu, Hawaii; Dr. P. Numa Rat, Antigua, Leeward Islands, W. I.; Dr. Francisco Bernaldez (Escuela de Medicina), City of Mexico, Mexico; Dr. Bevan N. Rake, Port of Spain, Trinidad, W. I.; Dr. Manuel Bonasso, (Arapey Esquina Colonia) Montevidio, Uruguay; Dr. Adolfo Briceno Picón, Merida, Venezula.

Advisory Council—Dr. T. B. Keher, 911 Chesnut Street, St. Louis; Dr. B. Browson, 123 West 34th Street, New York; Dr. Jos. Zeisler, 125 State Street, Room 27, Chicago; Dr. J. P. Knoche, Kansas City, Mo.; Dr. W. T. Corlett, 333 Prospect Street, Cleveland, O.; Dr. M. P. Vander Horck, Syndicate Block, Minneapolis; Dr. B. Merrill Rickets, 137 Broadway, Cincinnati, O.; Dr. H. W. Blanc, Sewanee, Tenn.; Dr. J. V. Shoemaker, 1519 Walnut Street, Philadelphia; Dr. J. H. Bloom, Louisville, Ky.; Dr. H. W. Stelwagon, 1411 Spruce Street, Philadelphia; Dr. J. C. McGuire, Washington, D. C.

Communications, notices of papers, etc., should be sent to the Secretary, DR. W. S. GOTTHEIL.
25 West 53 Street, New York City.

THE ARIZONA MEDICAL ASSOCIATION met in its regular annual session February 27, and remained in session three days. The following officers were elected for the ensuing year: President, Dr. H. A. Hughes; First Vice-President, Dr. R. C. Dryden; Second Vice-President, Dr. C. H. Jones; Third Vice-President, Dr. A. H. Hoeffer; Secretary, Dr. L. D. Dameron; Treasurer, Dr. W. T. Barry. The Association is only a year old, yet the meeting was marked with interest, much good being accomplished.

L. D. DAMERON, Sec'y.

THE following physicians have been appointed members of the Advisory Council of the Section on Anatomy of the Pan-American Medical Congress: Dr. F. H. Mall, University of Chicago, Chicago; Dr. Charles F. Dolley, 3707 Woodland Ave., Philadelphia; Dr. Edward K. Dunham, Carnegie Laboratory, New York; Dr. Elizabeth R. Bundy, Woman's Medical College, Philadelphia; Dr. Wm. M. Gray, Army Medical Museum, Washington; Dr. H. C. Tinkham, University of Vermont, Burlington, Vt.

OFFICIAL LIST OF CHANGES in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from March 11, 1893, to March 17, 1893.

Major John C. G. Happersett, Surgeon U. S. A., extension of leave of absence granted on surgeon's certificate of disability, is further extended three months on account of sickness.

First Lieut. Charles Willcox, Asst. Surgeon U. S. A., leave of absence granted is extended one month.

Capt. Blair D. Taylor, Asst. Surgeon U. S. A., is granted leave of absence for one month, to take effect when his services can be spared by the post commander.

Capt. N. S. Jarvis, Asst. Surgeon U. S. A. (Ft. Apache, Ariz.), is granted leave of absence for one month.